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Observations
ON THE
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PARASITIC INTESTINAL WORMS
DURING THE WAR.

BY WILLIAM NICOLL, D.Sc., M.D. ST. AND., D.P.H. CAMB.,
LONDON SCHOOL OF TROPICAL MEDICINE.

DURING the later years of the war I had several opportunities of making observations on the occurrence of worm parasites both in civilians and in soldiers, suffering, for the most part, with dysentery or other intestinal affection. Owing to the obtrusion of other work no connected or continuous series of examinations could be carried out, but such observations as I was enabled to make were sufficient to convince me that intestinal worms were playing some part—if only a small part—in the causation of enteritis amongst the troops. My examinations were made independently of bacteriological and protozoological examinations conducted simultaneously on the same cases, but, naturally, I was able to check any protozoological findings by personal observation. As it happened, about 80 per cent. of cases which came under my notice were infected with entamœbic cysts, chiefly *E. dysenteriæ*. I do not know what exact percentage was infected with dysentery bacilli, but there was a residue of about 10 per cent. which did not show infection with either pathogenic bacteria or protozoa, though it is possible that further continued examination might have demonstrated their presence. This residue of cases was found to harbour parasitic worms. The commonest of these were *Ascaris lumbricoides* and *Trichuris trichiurus*, but the occurrence of the tapeworm, *Hymenolepis nana*, was also noted. The last mentioned is, so far as I am aware, an unusual human parasite in this country, but it would appear to be common enough in Southern Europe, where it has been associated with serious epidemics of enteritis. It is also common in the United States of America. As a matter of fact, in the year following my observation of its occurrence M. C. Hall [74] drew special attention to the possibility, indeed probability, of its spread in the European war zone, and in 1920 Boulenger [77] recorded its presence in 2 per cent. of Indian troops in Mesopotamia. Another diarrhœa-producing worm, to which Hall made reference, is *Strongyloides stercoralis*, which is common in certain parts of France, but I have been unable to trace any record of its occurrence in the war. That it did play some part in the causation of enteritis must be regarded as highly probable and it is extremely significant of the importance of this worm that Stiles in America recommended that all recruits found infected with the parasite should be discharged.

LITERATURE OF WORM INFECTION IN SOLDIERS.

During and since the war a considerable literature dealing with the subject of worm infection in soldiers has been accumulating. More than one-third of it deals with the three commonest forms—namely, *Ascaris*, *Trichocephalus*, and *Oxyuris*. This seems to indicate that these worms, common though they be, have yet been considered worthy of attention. In the past ten years the literature on *Ascaris lumbricoides* alone has comprised over 30 contributions. Apart from such important work on the life-history of this parasite as that of Stewart,[1] and Ransom and Foster,[2] there have been many observations made on the occurrence of the worm under war conditions. No very comprehensive statistics are available as to the prevalence of ascaris in the civil population under normal conditions, but a number of investigations of a comparative nature have been made during the war. These statistics are somewhat conflicting. Bardachzy and Barabas,[3] for instance, found less infection in soldiers than in civilians in the proportion of 1 : 3. On the other hand, Dunzelt [4] found a reverse proportion when comparing the incidence amongst soldiers at the front and those in home billets—namely, a proportion of 21 : 8. Vegel [5] found 63 per cent. of an infantry regiment infected with ascaris, while only 14 per cent. of a few prisoners (8 out of 56) were infected. Gmelin,[6] again, found only 31 out of 300 sick and wounded soldiers (10 per cent.) harbouring the worm.

ASCARIS LUMBRICOIDES.

It is evident that there is no uniformity in these results. Speaking generally, one would expect to find in a civil population a considerably lower incidence of infection amongst men of military age than amongst women, children, and old men (i.e., the non-military population). The fact that in certain localities the incidence was found to be very much the reverse seems to indicate that in these localities infection was being spread with greater intensity than normal.

Of more importance than the question of the prevalence of the worm is the matter of its pathogenicity. If it is invariably and absolutely harmless to man, as some people appear to believe, then it is a subject of little interest from a medical point of view. It would be most comforting to be certain that *Ascaris lumbricoides* is quite a guiltless parasite, but unfortunately experience is against that view. For instance, it appears to have an occasional impulse to investigate the interior of the bile-duct, causing partial or complete obstruction. It may occasionally inspect the appendix. Tirumuti,[7] for instance, records a case of biliary obstruction due to ascaris in a 12 year old child. Pflugradt [8] records another case in which cholecystotomy was performed. Rosenthal [9] also describes the occurrence of ascaris in the bile-duct, and Pribram [10] records two instances of finding it in the bile-duct in the course of operation. Crowell and Hanmach [11] found ascarids twice in the liver. Blassberg [12] was so much impressed by these occurrences that he even went so far as to suggest that *Ascaris lumbricoides* might be *one* cause of epidemic jaundice. Again, Doberauer[13] reports a case of intestinal obstruction in a young boy due to an impacted mass of 21 ascarids, while Thaler [14] records notes of a case of intestinal hæmorrhage due to ascaris.

A much more remarkable incident is that recorded by Nacker,[15] who found a specimen of *Ascaris lumbricoides* in the Fallopian tube. It was apparently a case of primary pyosalpinx which had become adherent to and ruptured into the intestine. Through the lesion an ascaris had made its way from the intestine into the tube. Schloessmann [16] also records a number of surgical cases due to ascaris, while Dunzelt [4] in the paper already quoted found nine cases with marked gastro-intestinal symptoms which were definitely attributed to the presence of ascaris. Cholera is another intestinal disease in which, according to Guerrini [17] and to Vestia, ascaris may in certain instances play some predisposing part.

But ascaris, like certain other intestinal parasites, may exert pathological influence on organs outside the alimentary system. There is accumulating evidence to demonstrate that it may, and in fact does, give rise to pneumonic symptoms while invading its host. Steiner,[18] for instance, in reviewing the work of Ransom, Foster, Stewart, and Yoshida on ascaris infection, draws special attention to the frequent occurrence of fatal pneumonia in the experimental animals—namely, rats, mice, guinea-pigs, and rabbits. He asks the pertinent question, "May not the same thing occur in cases of human infection?" The same question may be put with regard to ankylostoma and possibly other parasitic worms. I have personally [19] recorded the occurrence of "pneumonia" in dogs undergoing experimental infection with *Ankylostoma caninum*.

Amongst other remote effects mention may be made of nervous symptoms, probably reflex, due to intestinal irritation, and of less or greater severity. Sustmann,[20] for instance, records the occurrence of epileptiform convulsions in a dog during the invading

stage of infection with ascaris. The question of toxic effects will be referred to later. Finally, the dictum of Ziegler [21] should be well borne in mind—namely, that *the most common intestinal parasites are not always so harmless as is often thought.*

TRICHURIS TRICHIURUS.

Passing now to a consideration of another *common* intestinal worm, *Trichuris trichiurus* (*Trichocephalus dispar*), we find a series of observations almost as varied as those on ascaris. With regard to its frequency, the figures available are not quite so definite as in the case of ascaris. The results recorded by Christofferson [22] may be taken as fairly representative. He found trichocephalus in 29 per cent. of autopsies on persons who had died from various diseases (in which trichocephalus did not necessarily play any part). Crowell and Hanmach,[11] in a similar series (Philippine Islands), found the incidence to be 34 per cent. Jouveau and Dubreuil [23] found 41 per cent. of Chinese infected with the worm. Mayer [24] met with 66 per cent. of infection amongst Chinese sailors. Lamourreux,[25] in Madagascar, found 75 per cent. of natives imported from Grand Comoro infected, but only 3 per cent. of Madagascar natives. Moog and Wörner [26] found it in 33 per cent .of civilians in Germany during the war (as opposed to 46 per cent. amongst soldiers). Vegel[5] found 41 per cent. of combatant soldiers infected, and 60 per cent. of men attached to a "Bäkereicolonne." Out of 56 prisoners, 28 were infected. Gmelin[6] found only 18 per cent. amongst sick and wounded. Hart [27] encountered it in 84 out of 200 post-mortem examinations (soldiers). Berndt's figures [28] are 126 out of 400. Dunzelt[4] found that infection was twice as heavy amongst soldiers at the front as in those at home (21 per cent. against 11 per cent.). These statistics indicate that trichocephalus was decidedly more frequent amongst combatant troops than amongst non-combatants. Moog and Wörner, moreover, state emphatically that the number of worm eggs found in examinations of civilians was trifling compared with the enormous numbers found in soldiers.

Trichocephalus, like ascaris, has been associated with a considerable variety of symptoms. In the first place, it undoubtedly causes a certain amount of intestinal irritation, which may be of varying intensity. It may be so slight as to give rise to no symptoms; it may be so severe as to cause intense enteritis, intestinal hæmorrhage, anæmia, and reflex nervous symptoms. The combination of causes leading to these symptoms may indeed have a fatal termination (Urechia and Mateescu.) [29] In three fatal cases recorded by these observers, the symptoms included, anæmia, great asthenia, and obstinate diarrhœa. Clinically, the cases were diagnosed as intestinal tuberculosis, but no evidence of this was discovered post mortem. Instead there were numerous specimens of trichocephalus, and the authors conclude that these worms were undoubtedly the cause of the illness. Bardachzy and Barabas[3] found that trichocephalus infection was frequently associated with anæmia and the presence of blood could often be demonstrated in the fæces (occult hæmorrhage). This fact, they maintain, must be taken into consideration in making fæcal examinations in future. Its importance is obvious. Moog [30] also reports the occurrence of occult hæmorrhages in trichocephalus infection, but only in less than 2 per cent. of cases. In addition to hæmorrhages, he found that gastro-intestinal disturbances of the most varied character might be caused. Hart [27] is decidedly of opinion that trichocephalus must be regarded as more than a harmless intestinal parasite, though no specific illness of a serious character could be attributed to it, apart from a greater or less degree of anæmia. Berndt,[28] as a result of his observations, insists that an energetic campaign should be initiated to prevent the further spread of these worms after the war.

Perhaps the most remarkable results in connexion with the occurrence of this parasite are those recorded by Guerrini [17] in reference to cases of cholera under his observation. He found that amongst 37 patients suffering from cholera 36 were infected with trichocephalus (i.e., 97 per cent.), whereas amongst cholera "carriers," only 4·5 per cent. harboured the worm, and in persons who did not harbour cholera vibrios only 13·5 per cent. had trichocephalus. From these statistics one can hardly avoid inferring that the presence of the worms was a directly contributory factor in the onset of the disease. It might be argued that these figures merely emphasise a common source for both infections—e.g., polluted surface water—but the extraordinary difference between cholera patients and cholera "carriers" in respect of their infection with trichocephalus—i.e., 97 per cent. as compared with 4·5 per cent.—lends great weight to Guerrini's opinion that the worms play a definite part in preparing the way for the vibrios.

OXYURIS VERMICULARIS.

The worm of next greatest importance appears to be *Oxyuris vermicularis*. This is another worm which, according to many misguided people, falls into the category of "common, therefore harmless." Such people can obviously have neither knowledge nor experience of the intense mental and physical disturbances which may in *certain* cases be set up by this excessively common worm. It is notoriously frequent in children, but, as a rule, in normal circumstances, infection dwindles and disappears with increasing age. The irritative symptoms to which it gives rise in children are familiar, and in a number of cases they undoubtedly affect the general health. Infection in adults is a notably more serious matter. The irritative symptoms, though not necessarily of greater intensity than in children, are capable of exercising a much greater mental effect, part of which is probably due to disturbed sleep. These are what may be considered the usual effects of infection with this worm. There are, however, other less common effects of more serious consequence.

There are not many records of oxyuris in connexion with soldiers on active service. Dunzelt[4] found infection in only 1 per cent. of soldiers at the front, and in 2 per cent. of those at home. Gmelin,[6] however, in examining 300 sick and wounded, found the worm present in 17 per cent. No serious symptoms were noted by either of these observers. Oxyuris, however, has not escaped notoriety as a factor in the production of disease, and its name is associated most particularly with appendicitis. A number of surgeons and pathologists have devoted attention to this aspect of the worm's activities. The most outstanding name is that of Rheindorf,[31 32 33 34 35] who has made a very extensive practical study of the matter. From his wide experience, both civil and military, he forms the conclusion that the overwhelming majority of cases of *septic* appendicitis arise through secondary infection of primary epithelial and mucous abrasions or defects. Such abrasions or defects are caused by, inter alia, oxyuris, trichocephalus, and ascaris. He finds that there is unquestionably a form of septic appendicitis due to oxyuris which injures the appendix wall and allows the ingress of septic micro-organisms. In addition to this septic form, however, he believes that oxyuris may cause a non-septic appendicitis with ordinary appendix symptoms. Lärven and Rheindorf [36] found that 10 per cent. of all appendices operated on contained oxyuris, that the worm was twice as frequent in that site in females as in males, and that it was most frequent between the ages of 10 and 30 years. They also believe that the frequency of infection has increased since the war. Rheindorf lays so much store on the importance of intestinal worms in the ætiology of appendicitis that he makes the following rather sweeping statement: "The prophylaxis (of appendicitis) must therefore consist in the first place of a war against intestinal parasites. Should this be attended with success, appendicitis as a national disease will be eradicated."

Wilson [37] is of opinion that threadworms in the appendix may be the direct cause of appendicitis,

and he reports a somewhat curious case of a woman who was cured of threadworms as a result of appendicectomy! Cecil and Buckley,[38 39] again, met with oxyuris 17 times in 129 cases of appendicitis. They found that it wanders under the mucosa and penetrates the lymph follicles. No inflammatory reaction was present in these cases, but the worms were nevertheless considered to be the cause of the illness in the cases in which they were present.

Amongst others who deal with oxyuris appendicitis, mention may be made of Ney,[40] Aschoff,[41 42] Innes and Campbell,[43] and Garin and Charlier.[44] It must be remarked that Aschoff [42] uses the term *appendicopathia oxyurica* to distinguish the clinical entity produced by oxyuris from true appendicitis, but it is doubtful if this distinction actually holds good. Additional references to the subject may be found in Sagrado,[45] Poling,[46] Van Gayer,[47] Hueck,[48] &c.

Two other matters in connexion with oxyuris may be mentioned. Guerrini,[17] in his investigation on cholera, already mentioned, found 43 per cent. of his patients infected with oxyuris, although apparently he does not attach the same importance to this worm as to trichocephalus as a predisposing cause. Klu,[49] again, records a case of cancer of the cervix ("portio") in a woman of 59 in which an egg-bearing oxyuris was found embedded in the necrotic tissue.

OTHER HELMINTHIC INFECTIONS.

A considerable number of other helminthic infections of admittedly serious import—e.g., bilharziasis, ankylostomiasis, and filariasis—acquired a more or less prominent place in military hygiene during the war, but with them it is not my purpose to deal at present.

The matter of helminthic toxins and serological reactions in connexion therewith apparently received little or no attention during the course of the war. In the two years immediately preceding the war, however, and since its termination, several investigations having an important bearing on the subject have been published. In this connexion the name of Weinberg is probably the best known. At the meeting of the British Medical Association in 1912, and in a paper [50] published during the same year, he gave expression to his views on the subject. Directly opposed to Weinberg's views, however, are those of Guerrini,[51] who in dealing with the question of the influence of trematode parasites on man concludes that there is little evidence for toxicity. It may be noted here that trematode parasites have not frequently been credited with toxic properties. The pathological effects of such species as are pathogenic are evidenced in more pronounced manner in other directions. Guerrini, on the other hand, does not appear to deny that pathogenic action may result from mechanical irritation, from the withdrawal of material essential to the host's economy, and from the promotion of secondary infection. The work of Bedson,[52] however, lends support to Weinberg's views, for he found that direct injection into guinea-pigs of extracts of ascaris and tænia produced definite evidence of intoxication on certain glands of internal secretion, similar in fact to that produced by bacterial toxins or injurious chemical agents. Paulian[53] also was able to demonstrate pathological effects on the kidneys, &c., produced by the injection of extracts of tænia, ascaris, and trichocephalus. Most recently Simonin [54] has reviewed the whole subject of the toxic effect of helminths on the internal organs, particularly the endocrine glands, and his conclusions are that a more intensive study will lead to a fuller recognition of the part played by worms in the ætiology of general malnutrition and constitutional disturbances. Rachmanow [55] deals with nervous lesions which may be provoked by helminth intoxication. Paulian [56] ascribes these nervous effects to anaphylactic action. Hensen [57] may perhaps be suspected of exaggeration in ascribing a case of optic atrophy to the action of toxic products of intestinal tapeworms, but he appears to have some ground for his opinion. Ragosa [58] deals at considerable length with the blood changes met with in subjects infected with tapeworms, while Meyer [59] deals with the production of specific antiserum in rabbits following the injection of cestode lipoids. Seyderhelm,[60] experimenting with intestinal parasites of the horse and of man, found that the worm extracts when injected into animals produced a severe primary pernicious anæmia with definite effects on the liver and spleen.

RELATION OF INTESTINAL WORMS TO BACTERIA.

The relation of intestinal worms to bacteria is dealt with in a few communications. Friedrich,[61] for instance, found that *Cysticercus fasciolaris*, a common parasite of rats and mice, was capable of acting as a carrier of dysentery, and that the fluid of cysticerci from infected animals contained the germs and was infectious for other mice. He reports similar results in the case of mouse-typhoid and gland streptococci. Barile,[62] again, believes that certain worm parasites of chickens play some part in the development or spread of avian pasteurelliasis. On the other hand, certain authors have found that helminths may possess and exercise a distinct bactericidal effect. This aspect has been discussed by Alessandrini [63] and by Bedson. The former showed that extract of ascaris exhibited a feeble bactericidal action on Flexner's bacillus. Extracts of sclerostomes from the horse had, however, a decided bactericidal action on the Flexner and Shiga-Kruse bacilli. Extracts of the tapeworms *Anoplocephala perfoliata* and *A. plicata* also had a strong bactericidal action on the Shiga-Kruse bacillus. He could not, however, demonstrate in the worm extracts the presence of any agglutinins or bacteriolysins.

SEROLOGICAL DIAGNOSIS.—TREATMENT.

The matter of serological diagnosis of helminth infection, which received considerable attention from Weinberg and from Welsh and Chapman as long ago as 1908, has formed the subject of further investigation by several workers during recent years, but most of this work is of pre-war date, and none of it deals directly with helminthic infection during the war. The more important of these publications made their appearance during 1912–14 and they include the work of Ghedini,[64] Manoiloff,[65] Romanelli,[66] and Kolmar, Trist, and Heist.[67] Using the Abderhalden dialysis method, Manoiloff obtained uniform positive results with *Tænia solium* and *Ascaris lumbricoides*. Romanelli dealt with complement deviation in hydatids, but also demonstrated the presence of specific antibodies in cases of infection with *Tænia solium*, *Ankylostoma*, *Ascaris*, *Bothriocephalus*, &c. Kolmar and his colleagues dealt with complement fixation in dogs infected with intestinal parasites.

Treatment of helminthiasis has not been affected to any great extent by experience under war conditions. Bilharziasis was probably the subject which made the most urgent call for the discovery of specific treatment. Three remedies—namely, antimony tartrate, quinine hydrochloride, and salvarsan appear to have been used with some degree of success. Christopherson [68] has experimented with the first, Miyagawa [69] found that quinine hydrochloride will ameliorate the symptoms without effecting cure, while Schrecher [70] has dealt with the use of salvarsan. Archibald[71] has experimented with an autogenous vaccine in the treatment of hookworm disease and reports favourably, and Moubet [72] has endeavoured to secure the abortive treatment of filariasis in the horse by hypodermic injections of potassium permanganate. The most important studies on helminth remedies in general are those of Hall and his colleagues.[73]

SANITARY AUTHORITIES AND HELMINTHIC INFECTIONS.

It may thus be judged from the foregoing that leading, as they have done, on the one hand to what may be considered as a primitive mode of life in trench warfare and on the other to impaired nutrition and a certain laxity of sanitary precautions on the part of the civil population, war conditions have played an undoubted part in the wider incidence of helminth

infections. What the effects of this on the general population have been appears to have stimulated neither interest nor inquiry on the part of any responsible sanitary authority in this country, a fact which in the interest of the general public health is much to be regretted. The importance of the commonest parasitic worms as possible pathogenic agents appears to be to a large extent ignored in this country, certainly as compared with the attention devoted to bacteria and other pathogenic organisms. Worm infections in children, for instance, are for the most part regarded with indifference, and we find the same "common, therefore harmless," attitude displayed towards them as used to be the fashion in regard to measles, a disease which, though commoner than scarlet fever and diphtheria, is the cause of more deaths than the former and half as many as the latter. It is only recently that enlightened public health opinion has endeavoured to assign its due importance to such a common and "*therefore harmless*" disease as measles.

In conclusion, I may venture to quote the opinions of two such well-known pathologists as Galli-Valerio and Weinberg on the matter. Galli-Valerio [75] expressed the opinion that the discovery of bacteria, having drawn everyone's attention to these important agents of disease, tended greatly to make us forget the pathogenic part played by helminth parasites; while Weinberg [76] was even more explicit in stating that "we are far from understanding the functional disturbances produced by certain localisations of parasites, the mechanical lesions, sometimes considerable, caused by helminths with buccal armature, and, further, the occasionally fatal bacterial infections in the ætiology of which intestinal worms at times play an indisputable part. But however severe the obvious signs are, they may in certain cases be only complications which result in masking the symptoms of helminthic toxæmia."

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PATHOGENICITY OF THE DIPHTHERIA GROUP:

A STUDY OF THE RELATION OF MORPHOLOGICAL AND CULTURAL CHARACTERISTICS OF THE DIPHTHERIA GROUP OF BACILLI TO PATHOGENICITY; WITH A NOTE ON THE LESIONS RESULTING FROM ANIMAL INOCULATION.

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EVERY laboratory worker knows the difficulties which may be encountered before a definite opinion can be passed as to the pathogenicity of a micro-organism belonging to the diphtheria group. Some authorities hold that the Klebs-Löffler bacillus may be recognised by its morphological and staining characteristics, others favour sugar fermentations as a means of differentiation, but all agree that the final criterion of virulence is animal inoculation. The problem is of great importance from the point of view of public health, and a reliable procedure obviating the expense of inoculation would be of great value in the investigation of "carrier" and other strains.

We approached this problem with some temerity on account of the amount of investigation which has already been undertaken, both in Europe and America, but the conflicting results published encouraged us in an attempt to correlate pathogenicity with other characteristics of the bacillus. It was decided to isolate diphtheria-like organisms from various situations—throat, nose, ear, urogenital tract, &c.—and to note the morphology, cultural peculiarities, and virulence of each strain. The first culture was usually made on Löffler's serum, and for isolation, plates of 5 per cent. serum agar were employed. Notes on staining, cultural properties, and animal inoculation were made as soon as possible following isolation. After full investigation strains were subcultured three or four times to ensure that we had employed pure cultures. Upwards of 100 strains were examined.

Virulence.

The virulence test was carried out by taking 48-hour broth cultures (at 37° C.) and injecting 2 c.cm. subcutaneously into the flank of a guinea-pig. Later, a very few strains were found to be non-virulent in this amount and it was decided to increase the quantity to 3 c.cm. In some instances where there was reason to suspect that we were dealing with a virulent strain which on injection failed to kill, even when 3 c.cm. were used, the experiment frequently succeeded on a second inoculation. As all the broth cultures showed a good growth, it has been brought home to us that some guinea-pigs have a certain natural immunity. Frequently the surviving animals were dark in colour and Smith[1] has pointed out that the darker animals are frequently the more resistant. The broth employed in the majority of cases was made up according to the method recommended by McIntosh and Smart,[2] the final reaction being controlled between cresol red and phenolphthalein—i.e., to a pH between 7·6 and 7·9. Morson's peptone was used. The test-tubes were $\frac{5}{8}$ in. in diameter, each containing 10 c.cm. of broth. Douglas's new dried trypsinised medium was employed for a few strains. Controls were made by injecting a second animal with a similar quantity of broth culture with antitoxin, and as it is known that the Park strain may produce a toxin with a minimum lethal dose below 0·001 c.cm. not less than 50 units of antitoxin were employed with each injection. A strain

was considered virulent if death occurred within eight days of inoculation provided that the antitoxin control remained well. This interval is in excess of that allowed by many authorities, but it was desired to bring all partially virulent strains into the pathogenic group.

Typical post-mortem findings consisted of necrosis, occasionally some induration at the site of injection, and gelatinous œdema over a varying area, but sometimes extending from groin to axilla. Rarely, the œdema involved the subcutaneous tissues over the whole ventral surface of the trunk. Deep red hæmorrhagic suprarenals were met with in a minority of cases, and it is not considered that this lesion is so constant a feature as some writers would lead us to believe. Slight congestion of the suprarenal vessels, however, was common, although in more than one-quarter of the examinations the suprarenals were found to be normal in appearance. Punctiform hæmorrhages were frequently seen in the perinephric tissues, and serous effusion, occasionally blood-stained, were found from time to time. The commonest lesion was without doubt a circumscribed œdema at the site of inoculation. When post-mortem examination showed the above lesions, with no evidence of other pathogenic organisms in the heart blood, peritoneum, or pleuræ, the strain was considered to be pathogenic. The limit of eight days was only approached by one strain (No. 9b, which co-existed with 9a, a very virulent organism). One strain took seven days (No. 53, isolated from nasal discharge 53 days after the onset of faucial diphtheria). Two strains took five days (Nos. 3 and 56, from a case of scarlatinal rhinitis). Five strains took four days (Nos. 34, 38, 43 from mild cases; 52 from what had been a severe case and isolated on the fifty-first day of the disease on a relapse; and 63, from a case of diphtheria following scarlet fever). Five strains took three days (No. 48, from a severe case; 50, isolated from a throat showing no clinical signs; 55, from an ear discharge following clinical diphtheria; 59, from a severe laryngeal case, and 60, from the throat of a scarlet fever patient showing no sign of diphtheria). The remainder of the virulent organisms were isolated from cases of clinical diphtheria, scarlatinal rhinitis, contacts, carriers, &c., killed within 48 hours.

Of the non-virulent strains three (Nos. 77, 78, 99) were obtained from what appeared clinically to be mild cases of diphtheria, one (89) was from an ordinary case, and one (37) from a severe case which died within 24 hours of the taking of the throat swab. In the latter instance polar staining was very poor; this strain may have co-existed with a virulent one overlooked in isolation. Unfortunately, the strain died out before the fermentation of dextrin had been attempted or inoculation had been repeated.

The fact that many cases from which virulent organisms were isolated showed no symptoms of the disease may be explained by the immunity response of the individual. The avirulence of the five strains from clinical cases in a fever hospital points to the conclusion that pathogenicity to the human being does not in every case run a parallel course to virulence exemplified by guinea-pig inoculation. There is, however, always the possibility that in each of these cases two strains may have co-existed. The question of pathogenicity is intimately connected with the factors involved in virulence—viz., toxin production and multiplication and invasive power of the bacilli. It has been pointed out that in the guinea-pig test virulence is not necessarily an indication of toxin production. Probably strains producing little toxin are virulent by virtue of their invasive power.

An attempt was made to differentiate between virulence due to toxin and virulence due to multiplication by injecting 3 c.cm. of broth culture and 3 c.cm. of a saline emulsion (500 million per c.cm. from Löffler's serum slopes) into separate animals. Strains 76, 83, 107, 108, 109, and 110 were used. Generally the saline emulsions took longer to kill, except strain 109, which killed in one day as compared with two days for the broth culture. The saline emulsion of strain 76 failed to kill, although the broth culture killed within 48 hours. It was not possible to recover the organism from the organs of the animal killed by the broth culture.

During the examinations on dead animals cultures were made from the heart blood, suprarenals, and site of inoculation in a number of instances. The following table gives the results obtained:—

No. of strains examined.	No. of positive cultures from dead guinea-pigs—		
	Site of inoculation.	Heart blood.	Suprarenal.
30	14	9	21

No connexion could be traced between these cultural findings and the time elapsing between inoculation and death of the guinea-pig; nor did the clinical course of the disease in the patients from whom the strains were isolated have any relation to the post-mortem cultural results in the guinea-pig. The frequency with which positive cultures are obtained from the organs of the dead animal indicates that a septicæmia is not uncommon, a complication which has been noted clinically from time to time.

Mallory[3] states that in fatal cases the bacilli may get into the blood and may be obtained in culture from various organs. Leede[4] isolated the causative organism from the blood in one of 18 cases of clinical diphtheria, and more recently Cartesegma and Casassa[5] have shown that 85 positive cultures were obtained out of 100 clinical cases from catheter specimens of urine. The cultures by the latter investigators were invariably contaminated with other organisms, and in view of the frequent presence of diphtheria-like bacilli in the urogenital tract of normal individuals this high percentage of positive results cannot be accepted until confirmation is obtained. The weight of evidence, coupled with the undoubted septicæmia which occurs in many inoculated animals—although conditions here are not altogether parallel with those in a clinical case—thus point to the conclusion that in some cases of diphtheria the lesion is not solely of a local nature.

Morphology.

The majority of the literature on this subject tends to the opinion that the pathogenicity of diphtheria-like organisms has little connexion with morphological and staining properties. Graham Smith[6] sums up the results of numerous workers by remarking—

> "These figures lend some support to the view, which has been occasionally advanced, that some, at least, of the so-called non-virulent diphtheria bacilli belong to a separate saprophytic species, though at present they cannot be distinguished morphologically or by culture from true virulent diphtheria bacilli."

More recently Gelien, Moss, and Guthrie,[7] in a series of observations on 160 carrier strains, concluded that virulent and non-virulent diphtheria bacilli were exactly alike and could only be distinguished by animal inoculation. Havens[8] (154 strains) found that the common belief that solid staining bacilli and certain barred and granular forms are avirulent was erroneous, and that morphology was no more a criterion of virulence in the diphtheria bacillus than in the pneumococcus. Stevenin[9] (50 strains, 30 of which were non-pathogenic) found all virulent and five of the non-virulent strains were Neisser-positive; all the non-pathogenic organisms were short. Great variation in Neisser staining was noted by Smith[10] (50 strains from ozæna and clinical diphtheria), but this he attributes to the use of London tap water, as characteristic granules were noted when distilled water was employed. As regards Neisser staining, we find fairly constant results from any one strain when a 24-hour Löffler's slope is examined. Three degrees in the intensity of granular staining were adopted for classification—viz., marked (++), normal (+), and poor (±). Of the virulent strains 19 showed poor Neisser staining. Marked or normal Neisser staining was noted in 7, and poor in 6, non-

VIRULENT ORGANISMS.

Strain.	Killed (in days).	Source.	Length.	Beading, &c.	Neisser.	Broth culture.	Glucose.	Maltose.	Lactose.	Saccharose.	Dextrin.	Remarks.
2	1	Nasal (clinically diphtheria).	M.	B.	+ +	T.D.	+	+	−	/	−	—
3	5	Throat.	S.	—	±	T.P.	+	+	−	/	+	G.P., suprr. congested.
4	/	,,	M.	—	+ +	T.P.	+	+	−	−	+	G.P., killed after 5 days; lesions typical.
5	2	,,	S.	—	+ +	T.P.	+	+	−	−	+	G.P., œdema, pleural effn., &c.
8	1	,,					+	+	−	−		G.P., lesions typical.
9a	1	Throat of same case.	S.	—	±	T.D.	+	+	−	−	+	,, ,,
9b	8		S.	—	+	T.	+	+	±	−	+	G.P., wasted local necrosis.
10	1	Throat.	L.	—	+ +	T.D.	+	+	±	−	+	G.P., lesions typical.
11	2	,,					+	+	−	−		,, ,,
12	1	,,	M.	—	+ +	D.	+	+	±	−	+	,, ,,
14	1	,,					+	+	−	−		,, ,,
15	1	,,					+	+	−	−		,, ,,
17	1	,,	S.	—	+	T.	+	+	−	−	−	,, ,,
19	1	Laryngeal case.	M.	—	+ +	T.D.	+	+	±	−	+	,, ,,
21	2	Throat.	S.	—	±	T.P.	+	+	±	−	+	,, ,,
23	2	,,	M.	B.	+ +	T.P.	+	+	−	−	+	,, ,,
24	2	,,	M.	B.	+	T.	+	+	−	−	+	,, ,,
25	2	,,	L.	B.C.	+ +	T.D.P.	+	+	−	−	+	,, ,,
26	1	,,	L.	C.	+ +	T.D.	+	+	+	−	+	,, ,,
27	2	,,	L.	—	+ +	T.	+	+	+	−	+	,, ,,
28	1	From nose (clinically diphtheria).	M.	—	±	T.D.	+	+	−	−	±	,, ,,
32	2	From severe case, at P.M.	L.	B.C.		D.	+	+	±	−	+	G.P., congestion of suprarenals.
33	2	Ordinary case.	M.	C.	+ +	D.	+	+	+	−		G.P., slight congestion of suprarenals.
34	4	Mild case.	L.	—	+ +	D.	+	+	−	−	−	—
35	2	From relapsed carrier.	S.	B.C.	±	D.	+	+	−	−	+	G.P., congestion of suprarenals.
36	2	Ordinary case.	S.	B.	±	D.	+	+	±	−	+	G.P., œdema +, culture H.B. +.
38	4	Mild case.	S.	—	+	T.D.	+	+	±	−		G.P., local necrosis and œdema.
40	2	Severe case.	L.	B.	±	T.P.	+	+	±	−		,, ,,
42	2	Typical nasal diphtheria.	L.	B.	+ +	T.D.	+	+	+	−	+	G.P., suprarenals congested.
43	4	Mild case.	L.	B.C.	+	D.	+	+	−	−	+	G.P., œdema +, slight cong. suprr.
44	2	Slight nasal discharge (scarlatinal).	L.	—	+	T.	+	+	−	−	+	Schick +, G.P., culture suprarenals +.
47	2	Severe case.	L.	—	±	D.	+	+	−	−		G.P., œdema +.
48	3	Hæmorrhagic diphtheria.	S.	—	+	D.	+	+	−	−		G.P., local necrosis.
49	2	Familial outbreak.*	L.	B.	±	T.D.P.	+	+	+	−	+	G.P., cultures, suprarenals and bile +.
50	3	No symptoms.	L.	Ba.	±	T.D.	+	+	±	−	+	G.P., œdema +.
51	2	Severe case.	L.	B.	±	D.	+	+	+	−		G.P., hæmorrhagic suprarenals.
52	4	Relapse. Originally severe.	L.	B.	+	T.	+	+	−	−		G.P., œdema +.
53	7	Mild case (nasal).	L.	B.	+	T.P.	+	+	−	−		,, ,,
55	3	Ear discharge.	L.	B.C.	+ +	D.	+	+	±	−	−	G.P., cultures, suprarenal and H.B. +.
56	5	Scarlatinal rhinitis.	S.	C.	±	D.	+	+	−	−	+	G.P., œdema.
57	2	Ordinary case.	M.	—	+ +	D.	+	+	−	−		G.P., œdema +, suprarenals hæm.
58	2	,,	L.	B.C.	+ +	T.P.	+	+	−	−	+	G.P., œdema +.
59	3	Laryngeal case.	M.	B.C.	+	D.	+	+	±	−	+	G.P., pleural effusion.
60	3	Scarlet fever case. Slight rhinitis.	L.	B.C.	±	D.T.	+	+	−	−	+	Schick +.
61	2	Scarlatinal rhinitis.	L.	B.	±	D.	+	+	±	−	+	G.P., œdema +, culture suprarenals +.
62	2	Doubtful case clinically.	M.	—	+	D.	+	+	±	−	+	G.P., œdema +, culture H.B. +.
63	4	Diphtheria following scarlet fever.	L.	B.	+ +	D.	+	+	±	−	+	G.P., œdema.
65	2	Mild case.	L.	—	+ +	T.	+	+	±	−	+	G.P., œdema +.
67	2	,,	L.	—	+ +	T.	+	+	−	−	+	G.P., peritoneal effusion, cult. suprr. +.
68	2	,,	S.	—	±	T.	+	+	±	−	+	G.P., peritoneal effusion.
71	2	Carrier.	L.	—	+ +	D.	+	+	−	−		Schick −, G.P., culture suprr. and H.B. +.
72	2	Nose (no symptoms).	L.	—	±	D.	+	+	−	−		Schick +, G.P., culture suprarenals +.
74	2	Ordinary case.	L.	—	+	T.	+	+	−	−	+	G.P., œdema +, culture suprarenals +.
75	2	,,	V.	—	+	T.D.P.	+	+	−	−	+	G.P., local necrosis and œdema.
76	2	Persistent nasal discharge.	S.	—	+ +	D.	+	+	−	−	+	G.P., œdema +.
79	2	Mild case.	L.	—	+	D.	+	+	−	−	+	G.P., peritoneal effusion, culture suprr. +.
81	2	Nasal discharge.	L.	B.	±	T.D.	+	+	+	−	+	G.P., œdema, congestion suprarenals.
82	2	Post-scarlatinal rhinitis.	L.	B.C.	+	T.D.	+	+	−	−	+	G.P., œdema, congestion suprarenals.
83	2	Mild case.	L.	B.	±	D.	+	+	±	−	+	C.H.B. +, saline emulsion killed 4 days.
87	2	Severe case.	L.	—	+	D.	+	+	−	−	+	G.P., suprarenals injected.
90	1	,,	L.	—	+	D.	+	+	±	−	+	G.P., suprr. cong., cult. suprr. and H.B. +.
91	2	Mild case.	L.	—	+	D.	+	+	−	−	+	G.P., suprarenals hæmorrhagic.
92	1	Nasal discharge.	S.	—	+	T.P.D.	+	+	−	−	+	G.P., peritoneal effusion.
93	2	Severe case.	L.	—	+ +	D.	+	+	−	−	+	G.P., œdema +, cult. suprarenals +.
94	1	Nasal discharge (contact)	M.	—	+ +	T.P.D.	+	+	±	−	+	G.P., œdema.
95	2	Mild case.	L.	—	+ +	T.	+	+	−	−	+	G.P., œdema, suprarenals injected.
97	2	Carrier.	L.	—	+	T.P.D.	+	±	−	−	+	G.P., œdema.
100	2	Ordinary case.	S.	—	+	T.P.	+	+	±	−	+	G.P., perit. effusion, suprr. hæm.
101	2	Carrier.	S.	—	+	D.T.	+	+	−	−	+	,, ,,
104	1	Mild case.	L.	—	+ +	T.	+	+	−	−	+	G.P., œd. +, cult. H.B. and suprr. +.
107	2	Carrier.	L.	B.	+ +	T.	+	±	−	−	+	G.P., œd. +, C.S. +, sal. emul. killed 4 days.
108	1	,,	L.	B.	+ +	T.P.	+	+	−	−	+	G.P., cult. −, sal. emul. 2 days, cult. suprr +.
109	2	,,	L.	B.	+ +	T.	+	+	−	−	+	G.P., cult. suprr. +, sal. emul. 1 day, C. suprr. +.
110	4	,,	L.	B.	+ +	T.P.	+	+	+	−	+	G.P., œd. +, sal. emul. killed 2 days, C. suprr. +.

* From baby with no symptoms.

Abbreviations.

Length.—L = Long (4–5 μ). M = Medium (3–4 μ). S = Short (below 3 μ). V = Various.
Beading, &c.—B = Beaded. Ba = Barred. C = Clubbed.
Neisser.—+ + = Marked Neisser staining. + = Normal Neisser staining. ± = Poor Neisser staining. − = No Neisser staining.
Broth Culture.—T = Turbidity. T.D. = Turbidity and deposit. T.P. = Turbidity and pellicle. D = Deposit with clear broth.
Fermentations.—+ = Acid production. ± = Very slight acid production. − = No acid production.
Remarks.—G.P. = Guinea-pig. Cong. = Congestion. Œd. = Œdema. Suprr. = Suprarenals. Cult. = Culture. H.B. = Heart blood. Perit. effu. = Peritoneal effusion. Hæm. = Hæmorrhagic. Sal. emul. = Saline emulsion (500 million per c.c. − 3 c.cm.).

virulent strains. No relation could thus be established between the intensity of Neisser staining and virulence. Further, beading, barring, and clubbing were noted in both virulent and non-virulent strains. Variations in length of the bacilli were divided into three groups—long (4–5μ), medium (3–4μ), and short (below 3μ). On reference to the table it will be seen that about 80 per cent. of the virulent bacilli belong to the "long" group, and less than 30 per cent. of the non-virulent organisms did not fall into the "short" group.

Fermentation of Sugars.

The fermentations of *B. diphtheriæ* have been the subject of much controversy since Hine[11] in 1913 stated that he "had yet to find an organism of the diphtheria group giving acid with glucose and dextrin

NON-VIRULENT ORGANISMS.

Strain.	Source.	Length.	Beading, &c.	Neisser.	Broth culture.	Glucose.	Maltose.	Lactose.	Saccharose.	Dextrin.	Remarks.
1	—	S.	C.	±	T.	+	−	−	+	−	—
6	From throat.	M.	B.	+ +	T.P.	+	+	−	−	−	—
7	From carbuncle.	M.	—	+	T.	−	−	−	−	−	—
13	From throat.	M.	—	−	T.	−	−	−	−	−	Morph. *B. hofmanni.*
16	From nose.	V.	—	+	T.	+	−	−	+	−	Case returned from fever hosp.
18	From throat.		B.	+		+	−		−		—
20	,,	L.	C.	+ +	T.P.	+	+	±	−	+	—
22	—	M.	—	−	T.	−	−	−	−	−	Morph. *B. hofmanni.*
29	—	M.	—	−	T.	−	−	−	−	−	,, ,,
37	Severe case. Died next day.	S.	B.C.	±	D.	+	+	−	−		—
39	Urogenital tract.	S.	—	±	T.	+	+	−	+		—
41	,,	S.	—	±	D.	+	+	−	+		—
45	,,	S.	—	−	T.	−	−	−	−	−	—
46	From nose.†	S.	—	−	T.	−	−	−	−	−	Schick +, morph. *B. hofmanni.*
54	Urogenital tract.	S.	—	−	T.D.	−	−	−	−	−	—
64	From nose.†	S.	—	−	D.	−	−	−	−	−	Schick +, morph. *B. hofmanni.*
66	Tonsillitis.	S.	—	−	T.	−	−	−	−	−	Morph. *B. hofmanni.*
69	Persistent rhinitis.	L.	—	−	T.	−	−	−	−	−	Schick +, morph. *B. hofmanni.*
70	From nose.†	S.	—	−	T.	−	−	−	−	−	,, ,,
73	Recurrent rhinitis.	S.	—	±	D.	+	+	−	−	−	*S. aureus* and *M. cat.* also found.
77	Mild case diphtheria.	S.	—	−	T.	−	−	−	−	−	—
78	,, ,,	S.	—	−	T.	−	−	−	−	−	Morph. *B. hofmanni.*
80	From nose.†	S.	—	−	T.	−	−	−	−	−	—
85	From nose (scarlet fever).	S.	—	−	T.	−	−	−	−	−	Schick +, morph. *B. hofmanni.*
86	Follicular tonsillitis.	S.	—	−	T.	−	−	−	−	−	Morph. *B. hofmanni.*
88	—	S.	—	−	T.	−	−	−	−	−	—
89	Ordinary case diphtheria.	S.	—	−	T.D.	−	−	−	−	−	Morph. *B. hofmanni.*
98	Scarlet: no symp. diph. (throat).	S.	—	−	T.	−	−	−	−	−	Schick +, morph. *B. hofmanni.*
99	Mild case diphtheria.	S.	—	−	T.	−	−	−	−	−	—
102	† Carrier.	S.	—	±	T.	−	−	−	−	−	—
105	Throat of contact.	S.	—	+	T.	+	+	−	+	−	—
106	† Carcinoma of lip.	M.	—	+	T.	+	+	−	+	−	—

† No symptoms.

and not with saccharose which proves to be other than *B. diphtheriæ*; all the organisms giving these reactions were fully virulent"—a conclusion based on a study of 71 strains, of which 17 were considered to be true *B. diphtheriæ*. Cary[12] (26 strains of "morphologically true" *B. diphtheriæ*) found that 23 produced no acid in saccharose; 15 fermented maltose, and 13 dextrin. He found no constant relation between virulence and fermentations, but virulent (and many avirulent) strains fermented glucose, and usually produced acid in maltose and dextrin but not in saccharose. Exceptions occurred, however, in the fermentations of maltose, dextrin, and saccharose by virulent strains. Durand[13] (224 virulent strains) found that glucose was invariably fermented, while with maltose, saccharose, and dextrin variable results were obtained. Smith[14] and Pilot[15] record similar results, while Graham Smith[16] gives an interesting instance of a village outbreak of diphtheria from which 22 strains were isolated, 19 of which fermented both saccharose and dextrin. Saccharose, however, is a disaccharide which is easily hydrolysed to glucose and lævulose, and autoclaving may bring about this result. Eagleton and Baxter[17] found that of 125 strains which fermented glucose but not saccharose, 72 only were virulent when tested by their intracutaneous method. It may be that this procedure is only applicable to fully virulent as opposed to slightly virulent organisms. Fifty-two out of these 53 non-virulent strains were from carriers and some may have been *B. coryzæ segmentosus*. They did not meet with a single virulent strain which fermented saccharose. On the other hand, Bell[18] (130 strains) found that all strains produced the same toxin and fermented glucose but not saccharose. It is generally accepted that *B. hofmanni* ferments none of the usual sugars and that skin diphtheroids produce acid in glucose and saccharose with variable results in maltose and lactose.

For fermentation tests 1 per cent. of the various sugars was used in broth, litmus being employed as an indicator. Acid production in glucose, maltose, and saccharose was generally apparent within 24 hours, but in lactose the action was frequently slower, and in dextrin three to four days were occasionally necessary. Of the virulent group (74 strains) all produced acid in glucose and maltose with no change in saccharose. Lactose fermentation was very variable—marked with eight and partial with 21 strains. The virulent bacilli which produced definite acid with lactose all killed within two days, as compared with an average killing time of 2·2 days over the series. Those which gave only partial acidity also had an average killing time slightly less than 2·2 days, if strain No. 9b be excepted. This strain co-existed with strain No. 9a—a much more virulent bacillus—in a clinically diphtheritic throat. With regard to dextrin, very few strains pathogenic to the guinea-pig failed to produce acid. One strain (28) only producing slight acidity was isolated from a case of clinical nasal diphtheria and killed within 24 hours. Four strains (Nos. 2, 17, 34, and 55) produced no acid in dextrin, but killed within 1, 1, 4, and 3 days respectively. No. 2 was from a case of nasal diphtheria, 34 from an ordinary case of faucial diphtheria, and 55 from an ear discharge.

Among the non-virulent organisms only one strain (No. 20) produced acid in glucose, maltose, and dextrin with slight change in lactose and none in saccharose. It was isolated from a throat and showed marked Neisser staining. Animal inoculation was twice repeated without result. Of the other non-virulent strains Nos. 7, 13, 22, 29, 45, 46, 54, 64, 66, 69, 70, 77, 78, 80, 85, 86, 88, 89, 98, 99, and 102 agree with Hine's fermentations for *B. hofmanni* (i.e., no acid production in glucose, maltose, lactose, saccharose, or dextrin). Two of these strains showed poor and one normal Neisser staining, while the remainder were Neisser negative. Hine[11] also gives the fermentations of skin "diphtheroid" bacilli as glucose +, maltose variable, lactose −, saccharose +, and dextrin −. Strains Nos. 1 16, 39, 41, 105, and 106 conform to these reactions, but on reference to the table it will be seen that they were obtained from very varying situations. Strain 18, from a throat, fermented glucose only, and agrees with Hine's[11] results for *B. coryzæ segmentosus*. Lastly, there is a group of three strains (Nos. 6, from a throat; 37, from a severe case of diphtheria; and 73, from a case of recurrent rhinitis) which by acid production in glucose and maltose only fall into a class by themselves. It is of interest that three virulent strains (Nos. 2, 17, and 34) gave identical fermentations. Investigation is proceeding to establish whether or no these six strains fall into the same serological group.

Broth Cultures.

The three points looked for were the presence of a pellicle (indicated by P. in the table), a deposit of organisms (D), and turbidity of the broth (T). Seventeen virulent strains and two avirulent ones showed a pellicle, which on repetition was not always obtained. We regard this factor as inconstant for any one strain, and of little importance as an indication of virulence. More than a third of the pathogenic series showed deposit only, with clear supernatant broth, but this was also seen with four non-pathogenic strains. Turbidity appears to have no importance in the differentiation of virulent from non-virulent strains.

Schick Reactions.

One of us (J. H. J.) carried out a series of Schick reactions which will form the subject of a later communication. The results obtained are of interest at the moment as some of our strains were isolated from cases on which these Schick reactions had been performed. Thus three virulent strains (Nos. 44, 60, and 72) were obtained from cases showing positive Schick reactions. Nos. 44 and 60 were isolated from the nose of scarlet fever cases with slight rhinitis, which was considered scarlatinal. No. 72 was obtained from the nose of a scarlet fever patient with no nasal symptoms. Strain 71 (also virulent) was from the throat of a case of scarlet fever giving a negative Schick reaction. The case later became a confirmed carrier. While in hospital a nasal discharge developed clinically similar to that of another case of scarlet fever in the adjoining bed, but from the latter a positive Schick was obtained, and strain 69 (non-virulent) was obtained from the nose. Strains 46, 64, 70, 85, and 98 (all non-pathogenic) were obtained from cases showing positive Schick reactions.

Summary.

Seventy-four virulent and 32 avirulent strains of diphtheria-like organisms were examined. Neither morphology nor the intensity of Neisser staining is of value as an indication of virulence. The pellicle sometimes seen on the surface of a broth culture is inconstant and may be given by virulent and non-virulent strains.

We regard fermentation of glucose, maltose, and dextrin with no change in saccharose as a very valuable, but not an infallible, indication of virulence. One strain which gave these fermentations was non-pathogenic. Six strains were encountered giving acid in glucose and maltose but no change in saccharose or dextrin; three were virulent and three non-virulent.

Fermentation of lactose by virulent and avirulent strains is variable. *B. hofmanni* does not ferment any of these five sugars. "Skin" diphtheroid bacilli ferment glucose, saccharose, sometimes maltose, but not lactose or dextrin.

In guinea-pigs dying after inoculation with a broth culture of virulent *B. diphtheriæ* the commonest lesion is a circumscribed œdema at the site of inoculation which tends to disappear if the animal lives more than four days. Serous effusions are sometimes found, and although hæmorrhagic suprarenals are not common the glands frequently show congestion. Cultures from heart blood and suprarenals of the dead guinea-pig indicate that a septicæmia frequently occurs.

This research was commenced in conjunction with Dr. L. H. D. Thornton, who during its course became seriously ill. It is hoped that he will publish the results of his work on culture media for the *B. diphtheriæ* at a later date. In conclusion, we desire to express our thanks to Dr. P. Fildes, of the London Hospital, who kindly supplied us with strains 1–30, together with the results of virulence tests which he had carried out, using in many cases a saline emulsion of bacilli. We wish to acknowledge our indebtedness to Prof. J. McIntosh for many valuable suggestions, and to the Medical Research Council for defraying the expenses incurred during this investigation.

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(*Continued at foot of next column.*)

A CASE OF WEIL'S DISEASE OCCURRING IN LONDON.

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IN view of the interest aroused by recent work on infectious jaundice and the relationship between this disease and a similar infection in rats, together with its general resemblance to yellow fever, the following case is worthy of record.

History.—A seaman, 39 years of age, has been at sea for over 20 years and has visited most parts of the world. During the war he served as an A.B. (R.N.) on the Harwich T.B.D. flotilla. His last trip abroad, in 1920, was in the Eastern Mediterranean; his ship called at Constantinople and Egyptian ports. For the last two years he has not been out of English waters, being one of the crew of a coastal petrol-ship of 500 tons, manned by nine hands, including the captain. When he first joined her the ship was fresh from the builder's hands; she was kept scrupulously clean. Both the patient and his captain were emphatic that no rats had ever been seen aboard their ship; indeed, it was their opinion that, on account of the smell of petrol, a rat, once introduced, would instantly leave it. The patient has always enjoyed good health, though he suffered in his younger days from rheumatic fever, malaria, and other illnesses incidental to a sailor's life in tropical waters. On March 28th, 1922, a week before admission to the Albert Dock Hospital, he fell into the Thames at Gravesend; being unable to swim he got a good ducking and swallowed a considerable quantity of Thames water, but after two minutes' immersion he was rescued, dried, rubbed, and put to bed on the ship. On the next day he expressed himself as feeling quite well. Three days afterwards, however, he experienced excruciating pains in all his joints so that he was unable to walk about the decks; after lasting two days these eased off. Feeling unwell he took to bed again with a temperature of 104° F., and it was then noted that he had become completely deaf.

Condition on Admission to Hospital.—He became an in-patient at the Albert Dock Hospital on April 4th. He was then distinctly ill. His mental faculties were blurred and he was almost completely deaf; he was, however, able to understand instructions when shouted into his right ear; bone as well as aerial conduction appeared to be equally impaired. (On inquiry it was elicited that, though naturally deaf on the left side, the sense of hearing on the opposite side had only become acutely affected since the onset of this illness.) The skin was of a pale yellow colour; the conjunctivæ were distinctly icteric and there were numerous dark purpuric papules on the scapulæ and on the dorsal vertebræ. Attention was directed to the throat; the fauces were injected and the nasopharynx covered with viscid mucus. In fact, the catarrhal state of the upper portion of the respiratory tract was the most conspicuous symptom. On abdominal palpation considerable tenderness and rigidity were elicited over the upper segment of the right rectus muscle, and the liver dullness extended 1½ inches below the costal margin: on the other hand, the spleen could not be palpated. The stools were copious and clay-coloured, containing but a trace of bile pigments, and it was remarked that they resembled an early case of sprue. The urine,

(*Continued from previous column.*)

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passed in normal quantities, contained a trace of bile and a cloud of albumin. During the next four days the condition of the patient became increasingly grave; the icterus assumed a bright green tinge and spread all over the body, being specially noticeable on the conjunctivæ and on the soft palate. He wandered during the daytime and became delirious at night. He was intensely thirsty, and headache appeared to be a prominent symptom. A pronounced conjunctivitis developed, the purpuric papules on the dorsum became more conspicuous, and the nasopharyngeal catarrh persisted. Constipation was pronounced; bile pigments appeared in increasing quantities in the urine together with one-eighth albumin and numerous granular casts. The pyrexia was of a remittent type ranging between 101° and 102° F., and at this stage the pulse-rate was relatively increased. The respirations were never increased above 30 per minute.

Blood Examination.—From a simple blood examination little information of value was obtainable; there was a definite leucocytosis of 15–20,000 with a relative increase of the lymphocytes up to 36 per cent. On the 6th, 14 c.cm. of blood were abstracted from the median-basilic vein; 6 c.cm. being injected intraperitoneally direct into a guinea-pig by Dr. H. M. Hanschell, while 8 c.cm. of citrated blood were transmitted to Dr. C. M. Wenyon and injected by him into two others. (Two of these animals succumbed with the typical phenomena of Weil's disease ten days after the third recovered.) At the same time the liver was punctured and the small amount of material thereby obtained, diluted in saline, was injected into a fourth guinea-pig. (This animal eventually died of the disease on the forty-first day.)

Course of Illness.—On the ninth day from the commencement of the illness an improvement in the general condition of the patient was noted; the temperature commenced to defervesce, and the bright jaundiced hue to fade; the stools became distinctly darker and more bilious at this stage. On the sixteenth day of the illness a recrudescence of the fever set in which lasted in an intermittent fashion for a week (see Chart 1) and subsequent to this period a post-febrile bradycardia developed (pulse 60). This secondary rise of temperature was accompanied by an exacerbation of throat symptoms and an increased rigidity and tenderness over the lower border of the liver. The icterus continued to fade, till by the twenty-fourth day it could be no longer detected on the trunk, though still discernible on the anterior aspect of the tibiæ. It was noted that the abstracted blood serum was distinctly bile-tinged when the skin appeared perfectly normal. The papules on the back faded slowly, and by the twentieth day had entirely disappeared. At this time, and at this time only, was the spleen definitely palpable, while three days after this ascertainable enlargement could no longer be detected.

Examination of the fundus oculi revealed a considerable engorgement of the veins of the disc, but no hæmorrhages. The tongue, which was furred and dry during the pyrexial periods, now began to clear and at the same time the sense of hearing became more acute. The systolic blood pressure taken at this stage was 130 mm. Hg, the diastolic 75. No enlargement of the lymphatic glands was noted.

There is little more to be said about the progress of this case. His strength gradually returned and he was discharged after 52 days in hospital.

Treatment.—This was entirely symptomatic; the only specific treatment attempted was the injection on April 18th of 0·15 g. neokharsivan which appeared to have little or no effect on the course of the disease.

Clinical Pathological Observations.—During daily urine examinations the centrifugalised deposit was searched for the leptospira, but none were ever found by this method, though at the same time injection of catheterised urine reproduced the disease in guinea-pigs. Coarse spirochætes of the *refringens* type were observed, but these were thought to be derived from the preputial sac. Bile was present in the largest amount on the twenty-first day, and at this time the urine gave an intense green reaction with a drop of pure acetic acid, while Russo's methylene-blue test was marked. (Four drops of a 1 per cent. watery solution of methylene-blue to 5 c.cm. of the patient's urine gave an intense emerald-green colour.) The amount of urine passed varied from 30–45 oz. per diem. Albumin was never present in large quantities, usually about one-eighth; granular casts and scanty pus cells were noted immediately after admission and persisted throughout the illness. The albumin disappeared on the thirty-fourth day, but the casts persisted and were still present in small numbers when the patient left the hospital.

Systematic observations on the blood showed a scarcely perceptible reduction in the total red cells or in the hæmoglobin. The leucocytosis was remarkably persistent, a slight rise of 11,000 being noted 12 days after the temperature had become normal. The Wassermann reaction was negative. After defervescence of the fever the blood was no longer infective, for guinea-pigs inoculated on the forty-second and forty-ninth day of the illness did not acquire the disease. The nasal and pharyngeal mucus was examined on several occasions for leptospiræ without success.

General Observations.

As far as I have been able to ascertain from a search of the literature this would appear to be the first authentic case (proven by animal inoculation) of infectious jaundice yet reported in England. Although a form of infectious jaundice has long been known to appear in times of stress and war, the disease was first established on a clinical basis as a definite entity by Weil in 1886. It is surmised that the epidemic of jaundice noted by Larrey in 1800 at the battle of Heliopolis was of this nature. The organism—*Leptospira icterohæmorrhagiæ*—was discovered by Inada and Ido in November, 1914 (first published in Japanese in February, 1915); subsequently this was confirmed in Germany by Huebener and Reiter in the same year. In 1916 Stokes and Ryle described and diagnosed by animal inoculation 10 cases in the British Army in Flanders, while the clinical aspect of the military cases was well described by Dawson, Hume, and Bedson. In 1919 a monograph on this disease was brought out by Martin and Pettit which summarised the information on the subject up to date. Highly illuminative accounts comparing the pathology, ætiology, and clinical appearances of Weil's disease and yellow fever have recently appeared from the pen of Noguchi.

Source of Infection.—The occurrence of this disease in man has generally been assumed to be associated with a similar infection in wild rats and mice, in which rodents it can exist as a harmless commensal; in them the organism is most abundant in the kidneys and urine (Miyajima, Martin and Pettit, Noguchi, Foulerton); it was thought during the war that intimate association of the troops with rats in the trenches accounted for the origin and spread of this disease. In the case under review I have been unable to trace any history of contact with possibly infected rats; on the other hand, it is difficult not to assume that the infection originated from immersion in contaminated water. This fact has been noted on many occasions, notably in the series observed by Sisto on the Isonzo in 1916–17; Reiter in 1919 definitely associated the occurrence of Weil's disease in the

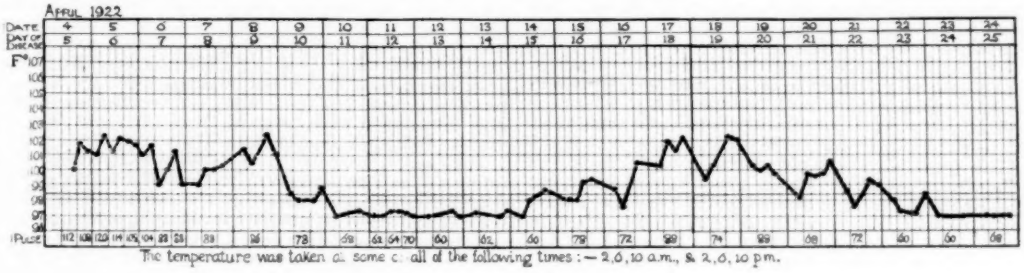

CHART 1.—Showing oscillations of temperature during 20 days of the course of the disease.

German Army with bathing in certain pools in Magdeburg and Brunswick, while Uhlenhuth and Zuelzer (1921), surmising that the source of infection was local in character, succeeded in stopping the epidemic by preventing the men from bathing in certain spots. They were led to connect the source of infection with the presence of putrefying material in the water. An almost identical case to the one recorded above is reported by Schürer (1922) in a canal labourer who, 14 days after falling into a sewage-contaminated pool in Germany, developed typical Weil's disease (proved correct by animal inoculation).

It is now known that spirochætes of the leptospira type are widely distributed in water; thus, Uhlenhuth and Zuelzer record a leptospira (*L. pseudoicterogenes*) in salt springs and in sulphurous wells in Hanover and also in the water-taps of different laboratories; finally Noguchi states that Miss Tilden has seen similar organisms in stagnant and salt waters in various parts of the United States.

Observations on the Clinical Aspects of this Case.

1. Assuming that the Thames water was responsible for the infection, the incubation period was about five days (Inada 5–7, Martin and Pettit 6–8 days).

2. The almost complete deafness noted during the initial pyrexia was probably of toxic origin and comparable to the same condition in other infectious fevers.

3. The infection was not a particularly virulent one; consequently prodromal symptoms, such as epistaxis and herpes, were not observed (Dawson, Hume, and Bedson).

4. The very intense muscular and joint pains in the early stages comparable to the same phenomenon observed by Valassopoulo in his Egyptian cases.

5. Absence of any lymphatic gland enlargement as noted in the French cases (Dawson).

6. The jaundice appeared early in the illness; it was barely visible on the patient's admission to hospital and probably commenced on the fourth day. This agrees with the general description (Martin and Pettit).

7. Eruptions of various kinds are described; Weil mentions the occurrence of roseolar spots on the abdomen, Martin and Pettit erythemomacular spots appearing on the seventh and eighth day. In my case the eruption appears to have taken the form of purple papules scattered over the back.

8. The conjunctivitis and general vascular congestion noted in the early stages is remarked by Martin and Pettit.

9. I cannot find any previous reference to the pharyngitis and post-nasal catarrh so evident in this case at the commencement of the illness; it suggested a possible path of entry of the organism from the mouth.

10. The secondary rise of fever on the sixteenth day was noted originally by Weil and illustrated by him in his temperature charts. He regarded it more in the nature of a relapse.

11. The post-febrile bradycardia is identical with the figure given by Martin and Pettit.

Diagnosis.

No leptospiræ were found either in thick or in thin films by means of a simple microscopic blood examination. The only reliable method of making a scientific diagnosis would appear to be the inoculation of a guinea-pig with a sufficient quantity of the patient's blood. It is questionable whether the discovery of the leptospira in the centrifuged urine is to be regarded as a feature of great diagnostic importance (vide Dawson and others). It may be, as in this case, they are not present in numbers sufficient to be visible under the microscope. Martin and Pettit say they appear in the urine from the fifteenth to twenty-third day of the illness, but they remark upon the difficulty which exists in differentiating on morphological grounds between *Leptospira icterohæmorrhagiæ* and certain saprophytic spirochætes (*Sp. pettiti*). The discovery of leptospiræ in the cerebro-spinal fluid is, of course, absolutely diagnostic, but, unfortunately, the fluid was not examined in this case.

I am much indebted to Dr. A. Graham Bryce, of the Albert Dock Hospital, for the care he has taken in making systematic observations on this case for me.

LABORATORY EXAMINATION by C. M. WENYON and H. C. BROWN.

On April 6th, 1922, we received from Dr. Manson-Bahr some citrated vein blood of the case described above, as well as a small quantity of blood obtained by liver puncture. Two guinea-pigs were inoculated intraperitoneally with about 2 c.cm. of the citrated vein blood and one guinea-pig with the blood from the liver. Of the two former one died on the tenth day and showed the picture typical of *Leptospira icterohæmorrhagiæ* infection. Large numbers of leptospira were present in the organs and a culture was obtained on rabbit-blood-agar medium. The second guinea-pig inoculated from the vein blood did not become infected and showed no reaction; the guinea-pig inoculated with the liver blood gave no febrile reaction and remained apparently well for over a month. It was found dead on the morning of the forty-first day. Post mortem it showed the characteristic picture of *L. icterohæmorrhagiæ* infection and leptospiræ were found in the organs.

A guinea-pig was inoculated with blood of the patient on May 11th and another on May 18th, but no infection took place, nor was there any febrile reaction. Of two guinea-pigs inoculated with a catheter specimen of the patient's urine on April 26th (the twenty-seventh day of the disease) one became infected and died on the fifteenth day. It showed the characteristic lesions post mortem. The other reacted only by a rise of temperature on the tenth day, and recovered. Guinea-pigs inoculated with urine on May 14th and May 18th died of a bacterial infection.

It was of interest to test the relationship of the human strain of leptospira to that obtained from wild rats in London. A culture of the rat strain which had been maintained in media for about a year was found to produce a definite febrile reaction in guinea-pigs which ultimately recovered, while the culture of the human strain isolated from the guinea-pigs infected from this case was highly virulent and produced a characteristic fatal infection.

On April 25th guinea-pigs were inoculated intraperitoneally as follows:—

No. of guinea-pigs.	C.cm. culture.	Strain.	C.cm. serum.
2	1	Rat.	—
2	1	Human.	—
2	1	Rat.	+0·5 normal human.
2	1	Human.	+0·5 normal human.
2	1	Rat.	+0·5 patient's.
2	1	Human.	+0·5 patient's.

The guinea-pigs which received the patient's serum were completely protected while the others reacted typically, those receiving the rat strain showing the characteristic febrile reaction and those the human strain a fatal infection.

On May 9th an experiment was carried out with the culture of the human strain and two cultures of *Leptospira icteroides* of yellow fever obtained from the Lister Institute. In this case the yellow fever organism, like the naturally occurring rat strain of *L. icterohæmorrhagiæ*, produced a febrile reaction when injected alone or with 0·5 c.cm. normal human serum, while with 0·5 c.cm. of the patient's serum there was no reaction. The human strain of *L. icterohæmorrhagiæ* injected alone or with normal human serum, as in the previous experiment, produced a fatal infection, while with 0·5 c.cm. of the patient's serum protection was complete. This experiment was repeated with the same result on May 16th.

It would appear that 0·5 c.cm. of the patient's serum completely protected guinea-pigs from infection with the patient's own strain of *L. icterohæmorrhagiæ*, the naturally occurring rat strain of *L. icterohæmor-*

rhagiæ and the yellow fever strain *L. icteroides*. Pressure of other work prevented the experiments being conducted further with a view to ascertaining the minimum protective dose of the patient's serum for each strain. Had this been done it is possible that a difference between the three strains of leptospira would have been observed. It is of interest to note that the patient's urine taken on April 26th, when he had apparently recovered, was still harbouring *L. icterohæmorrhagiæ*.

During these experiments the rectal temperatures of the guinea-pigs were taken daily. Chart 2 illustrates the temperature of a guinea-pig inoculated with the culture of the human strain, which proved fatal in every case. Chart 3 shows the course of the temperature of a guinea-pig inoculated with the culture of the less virulent rat strain which produced only a febrile reaction from which recovery took place. In the case of the human strain the typical lesions were found in the guinea-pigs after death. There was intense jaundice involving the whole abdominal contents and peritoneum, these being tinged a deep yellow or orange colour. There were extensive hæmorrhagic areas in the lungs and in the tissues about the lower part of the abdominal cavity. Numerous punctiform hæmorrhages occurred in the peritoneum. Leptospiræ, with their characteristic slender spiral bodies and hooked ends, could be demonstrated by dark-ground examination of a saline solution in which the liver or kidneys had been macerated. The organisms were also present in the urine. They were likewise found in Giemsa stain smears of the organs and tissues prepared by Levaditi's silver-nitrate method. The direct examination of the patient's blood failed to reveal leptospiræ. The diagnosis of such a case may be established with the greatest certainty by the intraperitoneal inoculating of two or more guinea-pigs with the blood or urine of the patient.

CHART 2.

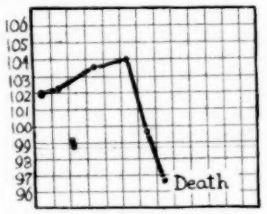

CHART 3.

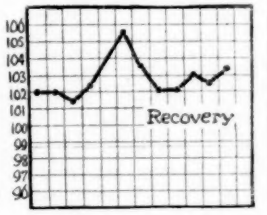

Chart 2.—Guinea-pig inoculated with culture of human strain of *L. icterohæmorrhagiæ*. A recently isolated rat strain behaved in a similar manner.

Chart 3.—Guinea-pig inoculated with culture of naturally occurring rat strain of *L. icterohæmorrhagiæ*. Recovery was due to loss of virulence owing to prolonged maintenance in artificial medium.

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THE OPAQUE MEAL:

ITS PRESENT-DAY VALUE IN GASTRIC LESIONS.*

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A CONSIDERABLE advance has been made in recent years in the technique used in the opaque meal examination of the stomach. The examination has attained a remarkable degree of accuracy, but it is difficult for those medical men not working in close touch with the larger hospitals to appreciate the continual advance taking place in this work. A report of the results of the opaque meal examinations carried out at the London Hospital during last year will give a fairly accurate idea of the present-day value of the examination.

Reliable statistics as to the after-results of medical treatment are difficult to obtain. This is especially true of hospital patients, as their habit of roaming makes it impossible to keep in touch with them. It is a different matter, however, if statistics are obtained while the patient is still under hospital observation; consequently it is comparatively easy to gauge accurately the diagnostic value of the opaque meal examination, given some systematic method of ascertaining the operative or post-mortem findings as soon as available, in order to compare them with the radiological findings. In a busy hospital it is practically impossible for the radiologist to be present at all abdominal operations. In fact, except in special cases, it is a waste of time, provided that an accurate description of the pathological conditions found reaches the radiological department.

The diagnostic value of any particular method is very unreliable if it depends upon memory. Mistakes are so easily forgotton, while the number of correct diagnoses has an unwarranted way of increasing—a false idea of accuracy being thereby given. It is seen, therefore, that hard fact must be depended upon if the correct value of any particular method is to be correctly gauged. Owing to the many and various technical methods advocated from time to time by workers in different parts of the world, I have for several years been using a system for estimating the value of each, in order to ascertain whether it was an advance or not on that previously used. A brief description of this system may be of value to others: Card-indexing is used and every item noted during the examination is entered on the patient's card, together with the ultimate diagnosis. A report of the findings is entered up in the ordinary way on the report sheet, which is sent up to the ward. To this report sheet a perforated slip is attached for the operative findings. This is filled in at the operation by the surgeon or his assistant and immediately returned to the department. The operative findings are in this way compared with the radiological findings, these are entered up on the card, and the slips themselves tabulated according to whether the diagnosis has been correct or otherwise, so that one is actually informed, week by week, as to the diagnostic value of the findings. A falling off, without any apparent cause, often indicates that either myself or my assistants require a rest.

Systematic Radioscopic Palpation.

I may mention that the method used entails considerable mental strain on the operator, and that his diagnostic value is lowered if he is below par. This systematic radioscopic palpation, as I term it, has taken me some years to bring to its present state of accuracy. It has stood the test of time better than any other technique that I have used, and has for three years consistently given a high percentage of correct findings. A full description of the method will be found elsewhere,[1] but a brief account of the chief features will not be out of place: A *small quantity* of a special barium cream is administered as the

* Read at the Cong. of Radiology and Physiotherapy, June, 1922.

[1] Proceedings Roy. Soc. Med., 1922.

"meal"; by abdominal palpation this is, so to speak, smeared over the interior of the stomach wall. This "whitewashing" process commences at the cardiac end, and the stomach is systematically examined on the screen inch by inch, the examination terminating at the duodenum. The gastric rugæ are in this way visualised and small ulcer craters can be detected among them, whether on the anterior or posterior surface of the stomach. I have found that ulcers in these positions are frequently missed by most other methods, as the shadow of the stomach, filled with the meal, usually obscures them entirely. Practically any method will show the grosser lesions, such as a bilocular stomach or a new growth invading the organ. The test will always be the detecting of the very small lesions. The duodenal "cap" and the duodenum itself are examined in the same systematic way.

The operator needs to have good eyesight, strong wrists and forearms. Full concentration is required of him if small lesions are not to be missed. In fact, it would be a good plan if the operator could be locked up while examining the patient, so that he might remain undisturbed by telephones, visitors, and other distractions. The method should not be confused with ordinary abdominal palpation or "belly-prodding." The diagnostic value of radiograms in this examination has always been unreliable, except, of course, for the grosser lesions. Consequently, I have been forced to discard them, unless they are needed as a record of some unusual condition, or for the purpose of demonstrating the lesion to the surgeon. In many a case where a small lesion has been detected by radioscopic palpation, it has been practically impossible to obtain a radiogram, owing to its position. In cases like these the condition would certainly have been missed if one had relied on the radiogram for the diagnosis.

I maintain that any pathological condition that can be demonstrated on a radiogram can be visualised by this method of palpation, but that an ulcer visualised on the screen cannot always be demonstrated on a radiogram. It will be seen, therefore, that one depends on *direct* evidence of the lesion—in other words, unless *actually visualised* on the screen, a positive diagnosis is not made; consequently the clinical history of the patient matters little. In fact, one has seen cases where the clinical history has been most misleading. All the symptoms may point to a duodenal ulcer, yet the lesion found may be not of the duodenum, but of the cardiac end of the stomach. Only a few weeks ago, a patient who gave a most typical history of duodenal ulcer was found radiologically and at operation to have an inoperable carcinoma of the body of the stomach.

Another point may be mentioned—there is a tendency to place too much reliance on the rate of emptying of the stomach. This has been proved to be dependent on so many outside factors—apprehension, fear, hunger, &c.—that it becomes of itself quite unreliable. In a perfectly normal stomach it was found to be possible to get a difference of four hours in the emptying rate by dieting alone.

Statistical Consideration of Findings.

In considering the figures of the last year, it must be remembered that only those cases are included in which the radiological findings were confirmed or otherwise by operation. A number of carcinomata were considered inoperable by the surgeon and sent home. These have not been included, although it would have been quite justifiable to include them under the head of correct diagnoses. Another point: It is not easy to arrange all the year round for every case to be examined by a radiologist proficient in the art of palpation. Illness, holidays, and changes in staff render this difficult. Apparatus, also, is not always working at concert pitch towards the end of a heavy day. As many as 15 gastric cases have had to be examined in one afternoon.

Let us review the figures for 1921 in detail at the London Hospital. The total number of gastric cases examined was 639. Of these 247 were operated on. A correct diagnosis was made radiologically in 231 patients. The reliability of a negative report from the radiological department may be indicated by the fact that of this total in 88 no ulcer was found at the examination or at operation, while on the other side of the account, 5 ulcers were missed, 4 of which were high up at the cardiac end of the stomach and 1 a small healed ulcer; 32 duodenal ulcers were detected and 7 missed, one of these being a very fat patient. In three cases the radiological findings were in favour of a gastric ulcer, but not found by the surgeon.

One case of interest requires special mention, and it is difficult to decide whether it should be placed on the credit or debit side of the account. The radiological findings were a bilocular stomach, caused by a chronic penetrating ulcer on the lesser curve. What was taken to be the crater of the ulcer could be seen as a fleck lying close to the lesser curve in the region of the constriction—this area of the stomach being fixed to the pancreas. The operative findings were as follows: A chronic pancreatitis with adhesions to the stomach, causing it to be bilocular. A calculus the size of a pea was found embedded in the pancreas. This was opaque to the rays and had been mistaken for the ulcer crater.

The results tabulated for the year 1921 are as follows:—Total cases examined, 639: Operative findings in 247; correct radiological findings in 231 (111 gastric, 32 duodenal, 88 negative diagnoses); incorrect diagnoses in 15.

The incorrect diagnoses were as follows: 4 ulcers high up on the lesser curve missed; 3 suspected ulcers not found at operation; 7 duodenal ulcers not detected (one fat patient); and 1 small healed gastric ulcer missed. I consider the last in the list might be excluded, as scars in the gastric mucous membrane are hardly likely to be detected. No carcinomata of the stomach were missed.

This gives us 14 incorrect against 231 correct diagnoses and two unplaced. The radiological diagnosis was therefore correct in about 94 per cent. of cases. I personally consider that the time is approaching when it will be possible to detect all gastric lesions radiologically. I do not say that the exact nature of the lesion will be diagnosed, but the presence of an organic lesion will be revealed.

THE ACUTE ANTRUM.

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TWENTY-FIVE years ago saw the first appreciation of the importance of the appendix. Now everyone recognises the signs and symptoms associated with the "acute" and "chronic" appendix. The conditions are always in the mind of the surgeon called in to an abdominal case. The appendix always gets its fair share of attention—perhaps too much at times. A similar appreciation of the importance of the antrum and other nasal sinuses is slowly growing to-day. The toxæmia and chronic ill-health produced by a chronic empyema of the maxillary antrum has been pointed out for many years by various writers of text-books on rhinology, but even now it is not sufficiently recognised by the majority of medical men. Acute and subacute sinusitis is even less familiar. Hence the frequency of chronic nasal sinus disease. This unfamiliarity is partly accounted for by the inconspicuous signs which may be present in sinusitis. In fact local signs may be entirely absent, and only by a process of exclusion may one light on a focus of disease in the antrum. The possibility of the condition is not borne in mind and so the diagnosis is missed.

The following series of five cases occurred in the practice of one general practitioner between February and May, 1922. The fact that five cases turned up in three months shows that sinus diseases may be pretty common. Five appendix cases in three months would be a fair incidence. I believe that sinus cases frequently go unrecognised, to the patient's detriment.

Three, if not four, of these cases would, I feel sure, have remained undiagnosed and drifted into a chronic toxæmia, labelled "facial neuralgia," "arthritis," or "chronic nephritis," had not the practitioner concerned been exceptionally observant and alive to the possibilities of the case.

CASE 1.—Female, aged 22, with a history of a feverish cold of ten days' duration, followed by "facial neuralgia." Seen on Feb. 24th, 1922, by Dr. A. M. Mitchell, of Guildford, who diagnosed acute sinus suppuration. This was a striking case, compelling attention to the inflammatory condition. When seen by me the same evening in a nursing home, the patient's features were unrecognisable. Left side of the face greatly swollen, left eye closed, conjunctiva ecchymosed; eye looked proptosed; lower lid livid; œdema had spread over frontal area and to the right eye, which was partially closed. Right lower lid was also livid to a lesser extent. Pitting on pressure over frontal bone. Temperature 101°. No complaint of nasal discharge, although a creamy crescent of pus could be seen under the left middle turbinal. Patient felt ill and complained of pain over left malar and frontal regions. No history of previous nose trouble.

The condition at the first glance suggested the grave diagnosis of cavernous sinus thrombosis, secondary to nasal sinus suppuration. The patient's general and mental state gave ground for hope that the vascular sinuses were not involved. At best it looked as if the antrum, ethmoids, and frontal sinuses on the left side were involved.

Transillumination showed marked dullness of left antrum. Puncture and irrigation through a Lichtwitz cannula yielded thick yellow pus. The X ray report, to our surprise, showed ethmoids and frontal sinuses clear. The X ray finding is not, of course, final.

Next day she was much better—operation was postponed. With daily irrigation of the antrum, combined with injections of silver salts, she became perfectly well in a fortnight without operation. The organism found was "Staphylococcus: Non-mannite fermenter B."

CASE 2.—Female, married, aged 35, who had had an attack of influenza, from which she did not quite recover. Her evening temperature kept about 99°–100°. She slept badly and complained of "neuralgia," mostly over left side of face. No swelling. No nasal discharge. She consulted Dr. Mitchell on March 10th. On the 12th I saw her with Dr. Mitchell. Both maxillary antra were full of creamy pus. With daily puncture and irrigation she was perfectly well in 11 days. The right antrum cleared up with six washings; the left took ten. Organism: *Staphylococcus pyogenes aureus.*

CASE 3.—A boy of 9, seen on March 25th, had an attack of influenza, with some tonsillitis and nasal catarrh. These symptoms all cleared up, but his temperature refused to settle. For three weeks it ran up and down, marking 103°, 104°, and 105° in the evening, during which period the boy said he felt perfectly well. He ate and slept well. Several doctors examined him, none of whom could find anything wrong.

Having had two recent cases of sinus infection, Dr. Mitchell thought this might be a case, although there were no signs suggesting sinus disease. I saw the boy with Dr. Mitchell on the 25th. Both antra were dark on transillumination. Proof puncture yielded thick pus, although no pus was visible by anterior rhinoscopy. As we considered that repeated punctures would prove too great a strain for so young a boy, I did a double nasal drainage operation the same evening. The temperature fell by lysis and was normal within a week. Daily irrigation through the operation holes cleared up the suppuration in less than a fortnight. An interesting point about this case is that he developed albuminuria a few days before I saw him. On one occasion there was hæmaturia. A specimen examined bacteriologically yielded an isolated staphylococcus colony, which the pathologist considered an accidental contamination. The albuminuria cleared up three days after the operation. The organisms present in this case were staphylococcus and pneumococcus.

What would have happened had the sinus suppuration not been discovered? In all probability the boy would have had chronic nephritis. He would have been labelled "nephritis following influenza"—the intermediate link, the antral infection, remaining undiscovered. I venture to think that this case is not unique, although it is the most remarkable of the series; probably many cases of nephritis originate in this manner. F. Roberts, in his Practice of Medicine (eleventh edition), states as follows:—

"It must be allowed that a large number of cases of acute nephritis arise, like pneumonia and pleurisy, apparently from cold or spontaneously, and whereas in these diseases the pneumococcus or the tubercle bacillus seems to be the efficient cause the microbic element in nephritis and the exact relation between it and cold are not always obvious."

No mention is made of purulent sinusitis as a cause of nephritis. Sir John Rose Bradford, in Sir Clifford Allbutt's "System of Medicine," says:—

"When nephritis appears to follow directly upon exposure to cold it is probable that there is some toxic agency as well."

Septic tonsillitis is well known as a cause of nephritis, and here it would seem that the toxins produced by the organism are the exciting cause of the nephritis, as no doubt they are in nasal sinus suppuration.

CASE 4.—Female, married, aged 30, with a history of a feverish cold for 14 days with slight rise of temperature. For three days she had had "facial neuralgia" with tenderness over left malar area and a blood-stained discharge from the left nostril. On April 4th she consulted Dr. Mitchell, who diagnosed "an antrum" and asked her to see me. Here the signs were fairly obvious. Transillumination showed dullness on the left side. By anterior rhinoscopy could be seen the œdema of the middle turbinate and the creamy crescent of pus outlining its anterior end, which are so characteristic of pus in the sinuses. Puncture and irrigation yielded thick muco-pus. (Yet a good many cases even of this type are not recognised.) The organisms present were, *Staphylococcus pyogenes aureus* and *Bacillus friedländer*. This case cleared up completely in ten days without operation.

CASE 5.—Male, aged 65, seen by Dr. Mitchell on May 9th. No history of any illness, even influenza. For over a year he had a swelling on lower margin of his left orbit, which suggested an exaggerated "baggy eyelid" of chronic nephritis and pitted on pressure. No pain, tenderness, or headache. Dr. Mitchell found the urine perfectly normal. Transillumination showed some dullness on the left side. The wash-out from his antrum yielded a drachm of thick inspissated pus, which yielded a pure culture of pneumococcus. Within a week the swelling had greatly lessened.

These cases show how varied and often how slight the signs of sinus suppuration may be. The acute and subacute antrum may easily escape notice. Other sinuses may, of course, be involved, but the important thing is to make the diagnosis of sinus infection; the particular sinus can be traced later. If the acute cases were diagnosed early, there would be fewer chronic cases, which do not yield so readily to treatment.

Post-mortem evidence is surprising. Dr. Gavin Young examined 30 bodies not specially selected as being likely to have sinus infections. His object was to investigate the relations of the sphenoidal sinus to the optic and vidian nerves. In the course of the investigation he examined the sphenoidal and maxillary sinuses with regard to the presence or absence of pus. His results, communicated to the Scottish Otological and Laryngological Society during the B.M.A. meeting at Glasgow, July, 1922, are almost incredible. No less than 50 per cent. of the sphenoids, and 40 per cent. of the maxillary sinuses, were found infected. Of course, the number of cases examined is too small to give a conclusive average, but it opens up a wide field for thought and observation. In any investigation of this kind it is essential to know what the individual died of.

Mr. Lawson Whale, in an article on sinusitis in "Influenza,"[1] quotes some interesting statistics dealing with this point. Weichselbaum found pus with his own diplococcus in the sinuses of every one of ten cases dead of influenza. Fraenkel examined 60 cases which died of influenza and found sinusitis in 75 per cent. The sphenoidal was the sinus most frequently affected. The degree of implication varied from serous effusion, hæmorrhagic, muco-pus to pus. Prym found the sphenoidal sinus affected in 75 per cent. of 92 cases which died of influenza. These statistics force us to the conclusion that sinusitis is a very common complication of the disease known as influenza. In 1894 Gradenigo[2] examined 203 bodies not specially selected. He found sinus suppuration in 45—that is, 22 per cent.

Cases of chronic neuralgia, hemicrania, nephritis without a cause, pyrexia without a cause, chronic nasal catarrh, often with a cough, attacks of broncho-pneumonia or a history of frequently catching cold, nasal obstruction, tinnitus, obscure rheumatism or arthritis,

[1] Influenza. 1922. Edited by F. G. Crookshank.
[2] Gradenigo: Sur l'Empyème Latent du Sinus Maxillaire. Ann. du Mal. de l'Oreille. 1894.

optic neuritis, recurring nasal polypi, all these may be secondary to sinus infection. The patient may even complain of nothing more than a feeling of malaise, or that he gets easily tired.

It is in the hope that the possibility of a sinus infection in such cases will be borne in mind that the notes of these cases are published. My thanks are due to Dr. Mitchell for his help and permission to use these cases.

A SAFE ARTIFICIAL EAR-DRUM.

BY SIR JAMES DUNDAS-GRANT, K.B.E., M.D. EDIN., F.R.C.S. ENG.

AN appliance, the value of which seems to me too little recognised, is the artificial drum of cotton-wool, for the original use of which we are indebted to the late James Yearsley, and for a modification to Laidlaw Purves.

Quite recently a middle-aged lady came to me presenting the dull, resigned appearance of the victim of extreme deafness, expecting to become "stone-deaf" and quite prepared to be told that "nothing can be done." The deafness had existed from her earliest days and was the result of suppurative otitis of which she had no recollection. The right tympanic membrane was almost entirely absent. The application of the artificial drum as nearly as possible on the region of the stapes enabled her to hear ordinary conversation at the distance of 6 or 8 ft. and produced a most remarkable lightening of her expression. After sitting in the waiting-room she expressed pleasure at hearing people's voices, but great annoyance with the noise of the traffic. When seen several days later she stated that she could not stand the noise of the "tube" and had to travel by motor-bus. Her pet dog's welcoming bark was almost unbearable.

This case is of the type with which aurists are familiar, and I might mention one of a gentleman, so deaf that he had to sit close under the pulpit in order to hear at all, who after the insertion of the cotton-wool drum had to move to a seat at the far end of the church, as he could not stand "the man's roaring." I have just seen a schoolmaster who was on the point of resigning his post 20 years ago, but who has been able to carry on the work ever since, by means of the regular use of this appliance. The ideal cases are those of a high degree of deafness in which there is loss of a considerable portion of the tympanic membrane, especially in the postero-superior part. If the head of the stapes is recognisable the artificial drum is all the more indicated. Complete dryness of the middle ear is desirable but not indispensable. Obviously any active inflammation is a contra-indication.

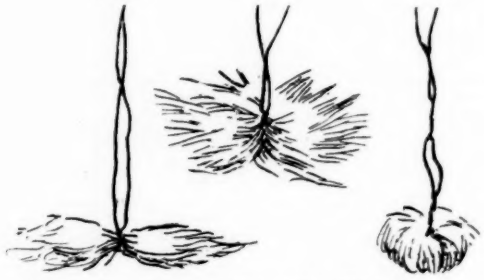
Method of Introduction of Pad.

The artificial drum consists of a small pad of cotton-wool of about the size of a pearl shirt-button, moistened with parolein or other light liquid vaselin containing (empirically) one grain of menthol to the ounce. It is introduced by means of a short, bluntish-pointed, toothless forceps. The spot of application is at a depth of about one inch from the orifice of the external meatus, so the blades should be of a little more than an inch in length. The springs should be quite weak. It need hardly be said that the aurist introduces the pad under the guidance of reflected light. When he has placed it as nearly as possible over the stapes he tests the hearing by speaking softly and presses on it with varying force and in different directions until he finds a spot the pressure on which is followed by improvement in hearing, as evidenced by the patient's ready replies. In some cases such a spot cannot be found, and the patient is probably insusceptible of improvement by this means. In the fortunate cases, which are numerous, the patient has to be taught to introduce the appliance for himself or herself, and if at all dexterous soon learns to apply it on the spot of best hearing. With a little practice it becomes easy both to introduce it each morning and to remove it at night.

Description of Drum.

In view of the possible difficulty of removal and the unfortunate results which might follow its retention I have devised a "captive" artificial drum, which may be designated as safe. A small wisp of long-fibred absorbent cotton-wool is pulled into a point at each end, a piece of fine sewing cotton is tied round its middle, and the two ends of the thread are cut off at a little over an inch from the cotton-wool. This then looks, as patients describe it, like a miniature white moustache hanging by a thread (Fig. 1). The fibres are then spread out radially like a star (Fig. 2). The

FIG. 1. FIG. 2. FIG. 3.

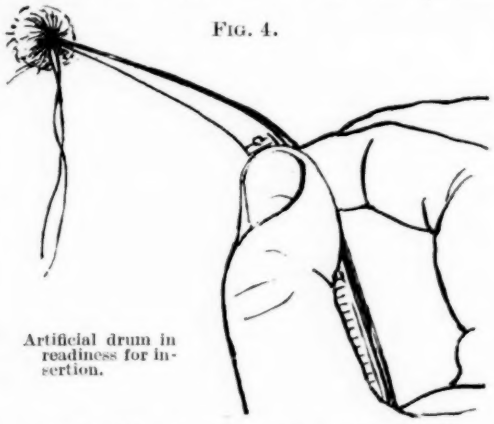


Three stages of preparation of the artificial drum.

tips of the radiating fibres are then turned in towards the centre so as to form a flat springy cushion of the size (as said before) of a pearl shirt-button (Fig. 3). It is seized with the forceps at the spot where the thread is attached to the "drum" (Fig. 4), dipped into parolein containing one grain of menthol in the ounce, and finally inserted into the ear.

Although for the specialist these details are unnecessary, I have given them in full so that the practitioner with however little experience of intra-

FIG. 4.



Artificial drum in readiness for insertion.

aural manipulations or even, in case of need, with none, may be able to effect great improvement in hearing in cases which seem almost hopeless. In proof of the fact that although it is, of course, desirable that the first introduction should be carried out by an expert it can be done by others, I may cite the case of a lady patient who having herself derived the greatest benefit from the appliance, successfully applied it to the ear of one of her friends and taught the latter how to apply it for herself. I do not approve of such "unqualified" practice, but a fortiori it ought to be within the scope of many a medical practitioner to make a trial of this "safe" artificial drum if no expert is accessible.

In any event I strongly urge that no case of deafness as a sequela of perforative suppuration of the middle ear (the same is true of certain cases of relaxed membrane) should be dismissed as unalleviable without a fair trial of this safe artificial drum or some equivalent.

OBSERVATIONS ON THE COLLOIDAL GOLD REACTION IN NEUROSYPHILIS

AND OTHER DISEASES OF THE CENTRAL NERVOUS SYSTEM.

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SINCE its introduction by Lange in 1912, the colloidal gold (C.G.) reaction has been subjected to much comment as regards its validity as a test applied to the cerebro-spinal fluid (C.S.F.) in the diagnosis of syphilis of the nervous system. With a view to determining the presence or absence of a positive C.G. reaction in various diseases of the nervous system, and more especially its value as a diagnostic test in neurosyphilis, this series of observations was undertaken. Most clinicians have encountered cases of nervous disease in which the physical signs indicated a definite neurosyphilitic condition—e.g., tabes dorsalis—but in which the diagnosis appeared to lack confirmation in that the C.S.F. yielded a negative Wassermann reaction (W.R.). It was particularly desired to ascertain the result of the C.G. reaction in this type of case. Observations have been carried out on over 300 specimens of C.S.F. The present series, however, is limited to 204 of the cases, as in all these it was possible to carry out a complete clinical investigation. All samples of C.S.F. were examined independently in the laboratory, without the worker concerned being aware of the clinical diagnosis.

I. *Clinical Evidence of Neurosyphilis Definite, with C.S.F. yielding a Negative W.R., but a Positive C.G. Curve.*

This first group of cases, 35 in number, are those which showed definite clinical evidence of neurosyphilis, but yielded a negative W.R. in the C.S.F., the C.G. test being positive. In all these cases, with the exception of two, both clinically examples of tabo-paresis, the C.G. curves were luetic in type, the curve reaching to a lilac or blue colour in the middle tubes of the series. In the two exceptions the C.G. curves were paretic in type. Of the 35 cases, the blood serum yielded a positive W.R. in 16, the remaining 19 being negative. Four cases of the series showed a pleocytosis in the C.S.F. (16, 14, 12, and 11 lymphocytes per c.mm. respectively); in three of these four cases the blood serum yielded a positive W.R. In one case of early neurosyphilis (pupillary changes, paresis of external rectus muscle, and inequality of tendon reflexes, with a definite history of syphilis) the blood serum and C.S.F. both yielded negative W.R., but the C.S.F. showed a luetic type of curve; three months later the C.S.F. was re-examined and the W.R. was found positive. In another case, one of meningo-myelitis, the blood serum gave a positive W.R., the C.S.F. being negative but yielding a luetic C.G. curve; two months later the C.S.F. was found to give a positive W.R.

Clinically the remaining 33 cases were classified:—

1. Tabes dorsalis: 12 cases (9 with blood serum yielding a positive W.R. and 3 with a negative).

2. Tabo-paresis: 7 cases (3 with blood serum yielding a positive W.R. and 4 with a negative).

3. Early neurosyphilis: 14 cases (2 with blood serum yielding a positive W.R. and 12 with a negative).

From the foregoing it is seen that in 18 cases of clinical neurosyphilis, the positive C.G. test was the sole laboratory evidence of syphilis (excluding one case with 14 cells per c.mm. in C.S.F.). In 14 cases of clinical neurosyphilis, the blood serum yielded a positive and the C.S.F. a negative W.R., but in the C.S.F. the C.G. curve was positive in all cases. In two cases showing a luetic C.G. curve, with a negative W.R., the latter reaction was found to be positive within three months. In no case of neurosyphilis, was a positive W.R. found in the C.S.F. apart from a positive C.G. reaction.

From the above evidence, therefore, it appears that (1) the C.G. test is a more sensitive test of syphilis in the C.S.F. than the W.R., and (2) when the central nervous system becomes involved by syphilitic infection the positive C.G. reaction appears at an earlier date than the W.R.

II. *Clinical Evidence of Neurosyphilis with C.S.F. yielding a Positive W.R. and a Positive C.G. Reaction.*

(A) *Dementia paralytica* (degenerative encephalitis).—17 cases of this condition (G.P.I.) were investigated. All cases yielded a positive W.R., both in the blood and C.S.F. Pleocytosis was present in 12 of the 17 cases, the cell counts varying from 20–37 per c.mm. The C.G. reaction was positive in all cases; 15 of the 17 cases gave paretic curves, and 2 gave luetic curves, but the latter were very early cases. It is to be noted, as will be shown later, that the paretic type of C.G. curve may also occur in tabo-paresis, tabes dorsalis, and disseminated sclerosis.

(B) *Tabo-paresis.*—Two cases; both yielding a positive W.R. in blood and C.S.F., the C.G. curve being luetic; pleocytosis was also present (200 and 15 cells per c.mm.); in both cases the tabetic element predominated. It will be noticed that of the seven cases clinically tabo-paresis mentioned previously (with W.R. negative in C.S.F.), five gave a luetic C.G. curve and two a paretic.

(C) *Tabes dorsalis.*—24 cases; 22 of these cases yielded a positive W.R. in the blood serum and 2 a negative. In 19 cases the C.G. curve was luetic, and in 5 paretic; one of the latter cases developed definite symptoms of G.P.I. four months after the C.S.F. was examined. Pleocytosis was present in all but three cases.

(D) *Early neurosyphilis.*—One case of pupillary inequality with facial paresis yielded a positive W.R. in the blood serum and C.S.F., with a pleocytosis of 25 cells per c.mm., and a luetic C.G. curve in the C.S.F.

III. *Clinical Evidence of Neurosyphilis with Negative C.G. Reaction.*

The 10 cases of this group were all either undergoing a course of novarsenobillon and mercury injections, or had completed such a course within six months of the C.S.F. examination. In all 10 cases the C.S.F. yielded a negative W.R., as well as a negative C.G. reaction; in five cases the blood serum gave a positive W.R., the remaining five being negative. In three of the cases the C.S.F.'s were known to have yielded a positive W.R. and a luetic C.G. curve prior to the course of anti-syphilitic treatment; in the remaining cases the C.S.F.'s had not been tested. Clinically, the 10 cases comprised four cases of tabes dorsalis (one with anterior radiculitis), three of early neurosyphilis with pupillary changes, two of meningo-myelitis, and one of unilateral optic atrophy. In three other cases of tabes dorsalis the positive C.G. curve was considerably modified, but not abolished by a course of anti-syphilic treatment, the W.R. remaining positive in the C.S.F.

From the above evidence, therefore, we find that (1) no conclusion can be drawn from a C.G. reaction in a case that is receiving or has recently received a course of novarsenobillon and mercury injections, and (2) anti-syphilitic treatment tends to modify the C.G. curve and may render a positive curve of the luetic type negative.

IV. *C.G. Reactions in Congenital Syphilis.*

We have had the opportunity of investigating only two cases of congenital syphilis. In one of these there was no clinical evidence of neurosyphilis, the physical signs being splenic enlargement, interstitial keratitis, and aneurysm of the femoral artery in Hunter's canal. The C.S.F. showed a normal cell count, negative globulin reaction, and negative W.R., but a positive C.G. curve of the luetic type. The blood serum yielded a positive W.R. The second case had Hutchinsonian teeth, and showed clinical evidence of tabo-paresis: both the blood serum and C.S.F. yielded a positive W.R., and the C.S.F. showed a cell count of 272 cells per c.mm. The C.G. curve was luetic in type.

V. *C.G. Reaction in Cases of "Tertiary" Syphilis other than Neurosyphilis.*

Ten cases were investigated, none of which showed any evidence of neurosyphilis. The 10 cases comprised:—

Cardio-vascular syphilis, 7 cases, viz.:—	Cases.
Cerebral thrombosis with hemiplegia	3
Aneurysm and myocardial degeneration	2
Arterio-sclerosis (in a young subject)	1
" with old iritis	1
Ulceration of nasal septum with gummatous scars on leg	1
Neurasthenia with history of syphilis 14 years ago	1

All 10 cases yielded a positive W.R. in the blood serum and a negative W.R. in the C.S.F. In all these cases the cell counts were normal and the C.G. reactions were negative. In a case clinically tabo-paresis with aortic incompetence the blood serum yielded a positive W.R., and the C.S.F. a negative W.R., but a paretic C.G. curve.

It appears, therefore, that in late manifestations of acquired syphilis a positive C.G. curve in the C.S.F. occurs only when the central nervous system is definitely involved.

VI. *C.G. Curve in Disseminated Sclerosis.*

Fifteen cases that could be confidently diagnosed clinically as examples of disseminated sclerosis were investigated. Of these 15 cases, 13 yielded a positive C.G. reaction; in 12 the curve was luetic in type, reaching to lilac or blue in the middle tubes of the series. In the remaining positive case, in which the disease was very acute, the C.G. curve was paretic in type. In the two cases yielding a negative result, the disease was of old standing, and apparently quiescent. In no case was the cell count of the C.S.F. above the normal, and the globulin reaction was negative in all cases with the exception of two, both of which showed slightly increased globulin to the butyric acid test.

It is concluded, therefore, that: (1) The majority of cases of disseminated sclerosis yield a positive gold reaction; (2) the type of curve is usually luetic but in acute cases may be paretic; (3) in old-standing quiescent cases the gold curve may be negative; (4) a C.S.F. showing no increase in cell count, with negative globulin and negative W.R., and a positive C.G. curve, suggests disseminated sclerosis.

VII. *C.G. Reactions in Organic Nervous Disease other than Neurosyphilis and Disseminated Sclerosis.*

Thirty cases of organic disease of the nervous system other than neurosyphilis and disseminated sclerosis were investigated. Of these, four yielded a positive C.G. reaction, viz.:—

1. Tuberculous meningitis, 1 case: C.G. curve 0012110000; lymphocytes 66 per c.mm., globulin test positive and W.R. negative.

2. Meningitis due to Pfeiffer's bacillus, 1 case: C.G. curve 0000121000; numerous polymorphonuclear cells present and positive globulin.

3. Traumatic serous meningitis, 1 case: C.G. curve 00011221100; cell count normal, globulin positive, W.R. negative.

4. Encephalitis lethargica, 1 case: C.G. curve 012110000; cell count normal, globulin positive, W.R. negative.

The 26 cases yielding a negative result were as follows:—

	Cases.
Sequelæ of encephalitis lethargica	3
Cerebral arterio-sclerosis	3
Mongolian idiocy	1
Cerebellar tumour	1
Paralysis agitans	1
Old meningeal hæmorrhage	1
Ménière's disease	1
Facial paralysis (neuritic)	2
Amyotrophic lateral sclerosis	1
Chronic alcoholism	2
Alcoholic neuritis	4
Diabetes with neuritis	1
Rheumatoid arthritis with neuritis	1
Other forms of peripheral neuritis	3
Sciatic neuritis	1

According to Stevenson, the C.S.F. of many cases of Mongolian idiocy gives a luetic curve. The typical case of mongolism examined by us gave definitely negative result. Since it has been considered by some authorities that certain cases of this condition have syphilitic relationship, it is possible that the presence of a luetic C.G. curve is an indication of a specific basis.

VIII. *C.G. Reaction in Functional Nervous Disorders.*

The series comprise 42 cases—viz., "idiopathic" epilepsy, 7 cases; confusional psychosis, 3 cases; neurasthenia, 20 cases (8 with slight inequality in size of the pupils, but with all pupillary reactions normal and no physical signs of organic disease); neurasthenia combined with hysterical manifestations, 4 cases; gross hysteria, 6 cases; enuresis nocturna, 1 case; and trigeminal neuralgia, 1 case. In all cases the C.G. reaction was completely negative, and the C.S.F. normal in other respects.

The Technique of the C.G. Reaction.

With reference to the technique of the C.G. reaction, we would emphasise the importance of the following points:—

1. The water used for the preparation of the C.G. and all reagents used must be absolutely pure and should approximate to the standard of purity required for "conductivity" experiments.

2. All glassware used in the experiments must be thoroughly boiled with potassium bichromate and sulphuric acid every time after use, washed with tap and distilled water and completely dried.

3. All the chemicals must be chemically pure and free from traces of organic matter which is so often present even in fine chemicals.

4. No curve is considered positive which is lower in scale than lilac.

5. The specimens of C.S.F. must be free from blood and sterile.

Conclusions.

From above observations, the following conclusions appear justifiable:—

1. A positive gold reaction in the C.S.F. is definite evidence of organic nervous disease.

2. In syphilis of the central nervous system a positive C.G. reaction appears at an earlier date than the W.R.

3. Although dementia paralytica is usually associated with a paretic type of curve and tabes dorsalis with a luetic type, definite exceptions occur; it is probable that the type of curve varies with the intensity of infection of the central nervous system rather than with the clinical type of disease.

4. Anti-syphilitic treatment on modern lines tends to modify and may even abolish a positive C.G. curve.

5. Disseminated sclerosis is associated with a positive curve, the type of which varies with the intensity and stage of the disease.

Finally, we wish to express our indebtedness to Dr. W. Broughton-Alcock, Central Laboratory, Ministry of Pensions, for enabling us to undertake this work, and to Dr. H. C. Lucey, who has carried out the Wassermann reactions on the majority of the specimens of the blood serum and cerebro-spinal fluids.

THE ANATOMY AND SURGICAL BEARING OF THE NERVES FOUND IN THE ABDOMINAL WALL.

BY R. COYTE, M.B. LOND., F.R.C.S. ENG.,
DEMONSTRATOR OF ANATOMY AND CLINICAL ASSISTANT TO THE SURGICAL PROFESSORIAL UNIT AT ST. BARTHOLOMEW'S HOSPITAL, LONDON.

THE ordinary anatomy of the nerves found in the abdominal wall is well known to most surgeons. The aim, therefore, of this contribution is only to emphasise special points seen in dissection and to illustrate their bearing on abdominal incisions.

The nerves concerned in the motor- and sensory-supply of the abdominal wall are the lower five intercostals, the last dorsal, the ilio-hypogastric, and the ilio-inguinal. The lower five intercostals enter the abdominal wall from beneath the deep surfaces of the costal cartilages, coming through from the thorax between the heads of origin of the transversalis muscle and the diaphragm. The last dorsal, the ilio-hypogastric, and the ilio-inguinal nerves enter the abdominal wall by passing behind the kidney and then piercing the transversalis muscle. All these nerves, then, pass forwards and downwards between the transversalis and internal oblique muscles, and all, except the ilio-inguinal, reach the outer border of the rectus sheath. The ilio-inguinal continues downwards through the inguinal canal with the spermatic cord. While the nerves are lying between the transversalis and internal oblique muscles they do not pass in direct lines to their destinations, but form a series of loops with their concavities looking upwards (Fig. 1).

These loops seem to be of some surgical importance. The intercostal nerves, moreover, do not, as might be supposed, all enter the abdominal wall from beneath their "corresponding" costal cartilages. As can be seen in Fig. 1 the seventh nerve passes into it immediately above the tip of the ninth cartilage, so that the upper four inches of the rectus sheath is left devoid of any actual nerve trunk. The eighth and ninth nerves enter the abdominal wall from beneath the ninth cartilage; the remaining nerves pass in beneath their corresponding cartilages. After piercing the outer border of the rectus sheath the nerves pass downwards and inwards behind the rectus muscle, finally entering its substance half-way across. In this way the inner half of the rectus sheath is left without nerve trunks (as shown in Fig. 2).

Influence of Anatomy of Nerves on Abdominal Incisions.

These anatomical details have all been recently tested by special and routine dissections in the anatomical department of St. Bartholomew's Hospital. Their influence on abdominal incisions will now be considered.

1. *Gall-bladder Incision.*—The upper four inches of the rectus sheath has been seen to be devoid of nerve trunks. An incision for exposure of the gall-bladder can therefore be made through all the layers from the right costosternal angle downwards, and outwards along the costal margin for four inches, without fear of injury to any nerve (Fig. 3A). Should the patient

FIG. 1.

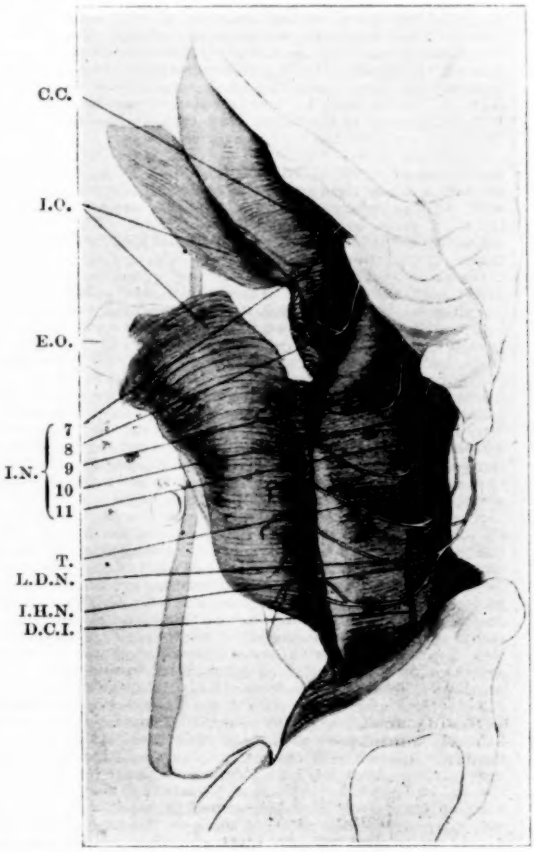


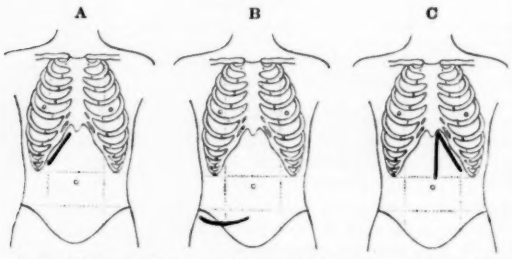
FIG. 2.

Diagrams showing paths of the nerves of the abdominal wall

C.C. = Tip of 9th costal cartilage. I.O. = Internal oblique muscle. E.O. = External oblique muscle. I.N. = 7th, 8th, 9th, 10th, and 11th intercostal nerves. T. = Transversalis muscle. L.D.N. = Last dorsal nerve. I.H.N. = Ilio-hypogastric nerve. D.C.I. = Branch of deep circumflex iliac nerve (unnamed). R. = Rectus muscle. S.F.D. = Semilunar fold of Douglas.

be very fat the incision can be carried for a further two inches along the costal margin. The seventh intercostal nerve will be sacrificed thereby, but the eighth can be retracted, and a good exposure in any patient may be obtained in this way. Division of the seventh intercostal nerve does not appear to lead to any noticeable weakness of the rectus muscle, but

FIG. 3.



A, Gall-bladder incision. B, Appendicectomy. C, Splenectomy.

there is no satisfactory explanation for this fact, especially as overlapping of the nerves in the upper half of the rectus muscle is prevented by the tendinous intersections.

2. *Appendicectomy.*—Battle's pararectal incision for appendicectomy and the muscle-splitting in the right iliac fossa both frequently give rise to considerable weakness of the abdominal wall, and occasionally to a definite hernia. This result can be avoided by paying proper attention to the anatomy of the nerves. The muscle-splitting incision (Fig. 3B) should start immediately above the anterior superior spine, and as it passes inwards to the outer border of the rectus sheath should form a crescent corresponding to the nerve loops already described. The splitting of the muscles and of the fascial plane between the internal oblique and the transversalis should be done by blunt dissection only, the risk of injury to the nerve trunks being thereby minimised. A good exposure is obtained by this incision, and if the muscles are sutured in layers a sound scar results. The pararectal incision is usually made along the outer border of the rectus sheath. The muscle is then retracted inwards, and the nerves either stretched or divided. This incision may be modified as follows: The nerve trunks have already been seen to disappear into the deep surface of the muscle about the centre. If a transrectal incision be made through the centre of the muscle the nerve trunks are not cut, and the incision can be prolonged upwards or downwards as far as may be necessary. Subsequent impairment of the muscle by this procedure is very slight, and may be neglected. In prolonging the incision downwards the deep epigastric artery may be cut, but this can easily be ligatured.

3. *Splenectomy Incision.*—The commonly used incision for exposure of the spleen extends from the outer border of the left rectus muscle along the costal margin for a distance of five to six inches, and must certainly cut the seventh to the tenth intercostal nerves. It often leads to serious weakness and bulging of the anterior abdominal wall—an effect which I have recently noticed in two cases. Nevertheless, it must be admitted that this incision sometimes seems to leave no obvious weakness of the muscles, a fact which is difficult to explain, since it is impossible to believe that the cut ends of the nerves can be replaced in exact apposition. As an alternative, I suggest making an incision (Fig. 3C) which detaches the rectus muscle from the costal margin, as in the gall-bladder operation. It can then be prolonged downwards from its inner end to the left of the mid-line as far as the umbilicus. The anterior sheath of the rectus is opened and the muscle is turned outwards, carrying with it the intercostal nerves. The posterior sheath of the rectus can now be incised, and a good exposure of the spleen obtained without injury to any of the nerve trunks.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A CASE OF BILATERAL EXOPHTHALMOS,

CAUSED BY LYMPHATIC ŒDEMA OF THE ORBITAL TISSUES.

BY A. F. MACCALLAN, C.B.E., F.R.C.S. ENG.

(*With Surgical Notes by* ROBERT DOLBEY, F.R.C.S. Eng.)

WHILE making an inspection of Tanta Ophthalmic Hospital during the month of May, 1921, the principal medical officer of the hospital, Dr. A. E.-H. Sadek, showed me a case of bilateral proptosis. As there were no ocular or orbital signs at that time, Dr. Sadek and I advised that the patient should be examined by a general surgeon. It is to be particularly noted that there were no signs of exophthalmic goitre or orbital tumour.

History.—Unfortunately the patient had been previously treated for exophthalmic goitre, and he did not return to Dr. Sadek until March 13th, 1922. Dr. Sadek sent him to Cairo to see me again. When I saw him on March 14th, he stated that he noticed the very slow and gradual development of exophthalmos during the last five years, accompanied by some frontal headache; during the last six months only he had complained of increasing headaches and occasional attacks of vomiting. There was a considerable amount of proptosis. The right eye exhibited ulceration of the cornea and the left eye a central leucoma of long standing. The eyelids could be made to cover the globes with difficulty. The right cornea was on a slightly lower level than the left. He was recognised to be suffering from exophthalmos of central origin—as, indeed, was the case when he was first seen at Tanta—and he was transferred to the care of Mr. Robert Dolbey at the Cairo Government Hospital; to Mr. Dolbey I am indebted for the surgical notes.

Condition before Operation.—There was complete loss of taste and of smell in the left nostril. X ray examination showed a dense shadow in the region of the pituitary fossa with definite enlargement of the middle fossæ of the base of the skull, more to the left than the right. The symptoms not being definitely pituitary, it was decided to perform subtemporal decompression on the left side.

Operation.—The operation was performed on March 15th, 1922, and an extensive craniectomy was performed. On opening the dura a great effusion of clear fluid was discovered between the dura mater and the pia mater over the frontoparietal region; the dura was healthy, but the pia was thickened and pearly in appearance, so that the convolutions of the brain could only dimly be discerned through it. The frontal, parietal, and temporo-sphenoidal lobes were so compressed by the fluid effused that the hand could be introduced into the skull cavity and the base of the brain palpated. There seemed to be no definite tumour, but the pia mater of the base of the brain was covered with dense adhesions which appeared to limit the effusion to the left side. The effusion clotted immediately it was mixed with blood.

Further History.—The operation was borne very well and an immediate improvement could be noticed in the exophthalmos of the left side, the eyeball having retracted almost to normal. Convalescence was uneventful until the tenth day, when the fluid re-collected with a great deal of pain and was evacuated through the wound. On the fifteenth day after the first decompression, the exophthalmos in the right eye being unchanged, a right-sided decompression was decided upon with an attempt to secure permanent drainage by means of thick strands of tubular woven silk passing subcutaneously from the subdural space to the axillæ. On opening the dura a condition was found similar to that on the left side; however, to a smaller extent. But from the commencement the anæsthetic was taken badly and there was much shock after the operation. Death occurred very shortly after from respiratory failure, the heart continuing to beat after periods of cessation of respiration.

Condition found Post Mortem.—The whole pia-arachnoid was discovered to be much thickened, the base of the brain covered with firm adhesions, the optic tract enveloped with organised plastic lymph, and the frontal and parietal lobes, especially on the left side, much flattened. In fact the left temporo-sphenoidal lobe was almost squeezed out of existence. Yet at no time had there been symptoms of speech or

hearing involvement. On opening the orbits from above the orbital tissues were found to be very œdematous, but with the exception of an increase in the orbital fat otherwise normal. The lateral ventricles and choroid plexuses were normal. There were nowhere signs of meningeal tubercle.

The conclusion arrived at as a result of the operation and autopsy was, that this condition originated probably in an attack of cerebro-spinal fever some years previously which had cleared up and left a thickened pia-arachnoid which interfered with the return flow of lymph from the orbit. The condition, in fact, seemed to be one of lymphatic œdema of the orbital tissues with most pronounced bilateral exophthalmos.

A CASE OF SARCOMA OF THE KIDNEY IN A YOUNG BOY.

BY FRANK M. HUGHES, M.D. BRUX., M.R.C.S. ENG.

SARCOMA of the kidney being unusual at an early age makes the following case worth recording.

A boy, aged 4 years, was brought to see me recently, with the following history: Six weeks previously he had fallen over a brick on to his abdomen. He was carried home and was unable to sit up for a week. There were no signs or symptoms of injury and no vomiting. A week after the injury he was able to walk, and shortly afterwards appeared quite to have recovered. The child was brought to see me because his mother had noticed a large swelling on the left side of his abdomen displacing the lower ribs and extending downwards on the left side. She had observed this when bathing him a week before.

On examination I found a large hard swelling extending from the left loin down to the anterior superior spine. It was quite painless on palpation and dull on percussion. The child had obviously recently lost much weight. X ray examination showed a mass extending from the left loin down to the anterior superior spine and across the abdomen and up towards the right renal region. The diagnosis of sarcoma of the kidney was confirmed by Sir Hugh Rigby and Dr. Cecil Wall. Laparotomy was considered inadvisable. Autopsy was refused.

The case is of interest in comparing the diagnosis with that of a diagnosis of congenital cystic kidney.

A CASE OF STRANGULATED INGUINAL HERNIA COMPLICATED WITH TORSION OF AN UNDESCENDED TESTICLE.

BY C. P. G. WAKELEY, F.R.C.S. ENG.,
ASSISTANT SURGEON, KING'S COLLEGE HOSPITAL, LONDON.

THE following case is sufficiently rare to merit record:—

A youth, aged 19, was admitted to King's College Hospital in April, 1922, complaining of a swelling and pain in the right groin. On the day previous to admission, while the patient was lifting some heavy boxes, he experienced an acute pain in the right inguinal region and fainted. He was taken home to bed; he vomited most of the night and was sent up to hospital next day. On admission there was a swelling the size of a hen's egg in the right inguinal canal; it was very tender and the skin over it was œdematous. It was seen that there was only one testicle in the scrotum and the patient stated that he had never noticed more than one testicle. There was a purulent urethral discharge. At first it appeared that the case might be due to a gonococcal epididymitis in an undescended testicle; but the vomiting and fainting attack on the previous day suggested a bowel condition. An incision was made over the swelling in the direction of the inguinal canal, the right testicle was exposed, and behind it was a knuckle of acutely inflamed small intestine. The right testicle was of an almost black colour and was twisted on its cord. It was not thought justifiable to try and perform an orchidopexy, owing to the very inflamed condition of the testicle; also the vessels in the cord appeared to be thrombosed. Consequently, an orchidectomy was performed, and the loop of gut, after enlargement of the opening into the abdomen, was found to assume a more normal colour, so it was returned to the abdomen. The inguinal canal was completely repaired.

Recovery was uneventful. A microscopic section of the testicle showed hæmorrhages throughout the organ.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF ORTHOPÆDICS.

EXHIBITION OF CASES.

A MEETING of this section of the Royal Society of Medicine was held on Nov. 7th. In the absence of the President (Mr. T. H. OPENSHAW), Mr. E. LAMING EVANS was in the chair.

Mr. H. A. T. FAIRBANK showed two cases of

Ischæmic Paralysis.

The first was a boy, aged 11, who had sustained a supracondylar fracture of the right humerus in May, 1918, which was treated "for a few weeks" by splints; on the removal of the splints contraction of the fingers and thumb was noticed. Massage was given without benefit. In August, 1918, operation was performed at a provincial hospital and some bone removed, and this was followed by prolonged massage and electrical treatment. On admission to the Hospital for Sick Children in April, 1922, there was marked flexion of the fingers and thumb; extension could not be performed voluntarily and passive extension was only possible when the wrist was flexed. There were no sensory changes and no wasting of the intrinsic muscles of the hand, but there was general wasting and weakness of the forearm muscles. The contracture of the flexors was so marked that a diagnosis of ischæmic contracture was made, although no definite hardness of those muscles was detected. Very great improvement resulted from treatment by gradual stretching on plaster slab and metal splint, coupled with treatment in the physio-therapeutic department, and complete cure was anticipated.

The second case was that of a boy, aged 9, who sustained a fracture of the lower end of the right humerus in December, 1921. No history of the treatment then received was available. He was admitted to the Hospital for Sick Children in January, 1922, with typical ischæmic contracture of the right forearm. There was flexion of the wrist and interphalangeal joints with some hyper-extension of the metacarpo-phalangeal joints, all of which were stiff with only a small range of painful movement. The long flexors of the hand were just acting but there was no power in the interossei. The general nutrition of the hand was very defective and the skin purple. Sensation to cotton-wool was lost over the whole hand on both aspects and to pin prick over the same area except over the hypothenar eminence and the ulnar side of the dorsum. Radiograms showed an old supracondylar fracture in very bad position. Only 10° of movement from 90° to 100° were possible at the elbow-joint; there was a scar apparently from a deep pressure sore on the anterior aspect of the forearm. Treatment on the same lines as that adopted for the other case had produced considerable improvement: but there was still anæsthesia in part of the median nerve distribution, and the median intrinsics remained almost completely paralysed; while movements at all the joints were defective, and there was only slight power in the long flexors. Mr. Fairbank invited opinions as to whether or not the median nerve should be explored.

Mr. W. R. BRISTOW thought exploration of the median nerve should certainly be carried out with the object of obtaining a return of the valuable median sensation in the hand. The physiological division of the nerve was probably in the region of its muscular branches to the pronator radii teres and long flexors, so that little could be done to secure a return of muscular power. Mr. Bristow also showed sections illustrating the differences in the changes which took place in muscle: (*a*) in a peripheral nerve lesion, and (*b*) in ischæmic contracture.

Mr. P. B. ROTH suggested operating on the bony deformity first, since in his experience of these cases the deformity was often responsible for the paralysis—the brachial artery and median nerve being stretched over the bony projection. If this were done the nerve might recover.

In reply Mr. FAIRBANK said he preferred exploration of the nerve. For the bony deformity at this late stage he was content to perform a simple osteotomy.

Mr. P. MAYNARD HEATH showed a case of

Traction Fracture of the Small Trochanter of the Femur.

A boy, aged 15, was sitting on the end of his bed and slipped off, landing on the floor on his buttocks. He immediately experienced great pain on the front and inner side of his right thigh and found he could not raise his right leg. He crawled into bed and was treated by rubbing and fomentations. He was seen by Mr. Heath eight days after the accident, when there was no deformity, but active flexion of the hip-joint was impossible either when lying or standing. In walking the leg was swung forwards. Attempts to flex the hip caused pain shooting down the inner side of the thigh. There was tenderness behind the great trochanter and also in Scarpa's triangle on deep palpation. X rays revealed a fracture of the small trochanter with very little separation. No retentive apparatus was employed, and the boy returned to school, where he took things easily. He was now (five months after the accident) playing Association football, but there was still some wasting of the thigh and buttock. Ludloff's sign (inability to flex the thigh when sitting, with deficient flexion, only about 30°, when lying down) was still present. Mr. Heath said that this was a rare condition, this being the twenty-eighth recorded case. Ruhl, who had made a study of these cases, had come to the following conclusions: (1) This fracture occurs chiefly during the second decade, but cases occur in old age. (2) It is an arrestation fracture due to muscular effort to avoid falling. (3) Ludloff's sign is the chief symptom. (4) Pain is felt on pressure in the direction of the small trochanter either from the ilio-pectineal fossa in front or from the gluteal fold. (5) The separation is incomplete, since the thigh can be maintained in a position of slight flexion, adduction, and rotation outwards. (6) Treatment: rest in bed for two or three weeks with the thigh flexed, abducted, and rotated outwards, combined with hot-air baths, massage, and active exercises to induce movement. (7) Should death not occur from intercurrent disease (a grave risk in old patients), prognosis as regards the restoration of complete function is good.

Mr. W. T. GORDON PUGH had had a case of the same nature. This was a boy aged 14, who had previously been under the speaker's care for acute osteomyelitis of the lower ends of both femora and of the right tibia from which he had made a good recovery. He was discharged with good movement. Three months later he was readmitted to Queen Mary's Hospital with a history that while running and in the act of lifting the left thigh he heard a crack and felt a severe pain in the inner part of the left groin. He did not put the left foot to the ground but fell over to the right. There was no deformity or shortening, but all thigh movements were slightly limited and painful. X rays revealed a fracture of the lesser trochanter, which united in the displaced position after treatment by flexing the knees over pillows. On his discharge five months later there was full movement and no tenderness.

Mr. ROTH had had a private patient in whom he had diagnosed this fracture, but he had been unable to confirm the diagnosis by X rays.

Mr. D. MCCRAE AITKEN had seen a case in a man aged 60 who complained of pain and limitation of movement. Movements were improved by massage but the pain continued.

Mr. FAIRBANK had inflicted this injury on a boy aged about 10 or 11 during manipulation of the hip, fortunately without serious inconvenience to the patient.

Mr. AITKEN showed radiograms of three different stages of

Osteo-Chondritis of the Hip

in three members of the same family—T. M., aged 7 (male); and A. M., aged 13, and R. M., aged 20 (females). In addition to the hip condition A. M. had a slight luxation forwards of the upper ends of both radii, and R. M. had developed considerable limitation of movement of both radii associated with luxation of the heads of the radii and scoliosis. X ray plates of the last case showed arthritic changes of the head of the femur in addition to some mushrooming.

Mr. R. C. ELMSLIE recalled a paper by Calot on subluxation of the head of the femur associated with coxa plana.

Mr. A. H. TUBBY regretted that he had not obtained late radiograms of three cases of congenital dislocation of the hip in members of the same family, all of which he had treated.

Mr. FAIRBANK suggested that the cases were of arthritis rather than of true pseudo-coxalgia. The appearances in the X rays suggested to him an ulcerative or absorptive arthritis.

Mr. LAMING EVANS inquired whether there were any signs of rickets in the three cases.

Mr. AITKEN, in reply, said that there was no evidence of rickets in any of the cases, and that he had not seen Calot's paper. While he agreed that in the eldest case there were definite arthritic changes superimposed on the original osteo-chondritis, he adhered to his original diagnosis.

Mr. HEATH also showed a case of

Subluxation of the Inner End of the Right Clavicle

in a man aged 30. There was no history of direct injury, but the condition was thought to have occurred during the unaccustomed exercise of bowling. At the same time there was severe pain behind the right ear. The swelling had not altered since first observed last June, but there was still severe pain in the back of the head during certain movements of the right arm and pain in the right shoulder when lying down. Examination showed a prominence of the inner end of the right clavicle, and X rays revealed no enlargement of the bone. He asked for suggestions as to treatment.

Mr. TUBBY had had a similar case in a man aged 55, and he agreed that treatment presented a difficult problem. In his case he had eventually operated and scraped out a quantity of gelatinous material which proved on microscopic examination to be thyroid tissue. There was no evidence of a growth elsewhere. For Mr. Heath's case he suggested exploration if ordinary treatment by counter-irritation failed.

Mr. BRISTOW showed a case of

Tendon Transplantation.

The patient suffered from a gunshot wound of the thigh in 1918. He had a large scar on the front of the thigh; the quadriceps extensor femoris was not functioning, and he was unable to extend the knee. The biceps and some of the inner hamstrings were transplanted to the front, and attached to the patella at a hospital in the country. The patient stated that he was worse as a result of this operation, for although he could strongly extend the knee-joint he could no longer flex it more than a few degrees on walking. He was unable to flex the knee against gravity except when lying on his face, when 15° to 20° of flexion were possible—the transplanted muscles and the remaining hamstrings both acting strongly. The vastus internus, which had recovered, remained flaccid. It therefore appeared that the transplanted hamstrings still acted with the flexors. Dr. J. Sainsbury (in charge of the Physical Training Department at Shepherd's Bush) thought further treatment by physical means, by which the patient had already been treated for nine months at another hospital, unlikely to be successful. While there was undoubtedly a mental factor in the case, Mr. Bristow was inclined to think the only available treatment was to undo the transplant.

Mr. FAIRBANK, Mr. ELMSLIE, Mr. PUGH, and others agreed that the transplant should be undone.

Mr. ELMSLIE showed two cases of

Congenital Deformity of the Upper Limbs.

The first case was that of a boy, aged 15, who had formerly been under the care of Mr. Openshaw for congenital deformities of the arms and bilateral congenital talipes equino-varus. He had been treated by manipulation of the feet and division of the plantar fascia at the age of 3 years, and four years later the wrists were manipulated and plaster applied. In 1916 the right elbow was fixed in plaster at a right angle. In 1922 the patient came under the care of Mr. Elmslie. He then had bilateral talipes equinus with much wasting of the legs. The hands were held fully pronated, with the elbows extended and wrists flexed. There was marked wasting of the shoulders, arms, and forearms, but there was some power in the flexor and extensor muscles of the forearm and hands. Mr. Elmslie had treated the left foot (which was more severely affected) by osteotomy of the fibula and of the neck of the astragalus, followed by wrenching and plaster. The hands were manipulated and extended by splinting. An arthroplasty was performed on the right elbow. The second case was one of congenital deformity of the upper limbs in a little girl. The deformity strongly resembled that seen in Erb's paralysis, but was symmetrically bilateral, so that he regarded it rather as a congenital deformity than a birth palsy.

Mr. BRISTOW congratulated Mr. Elmslie on the improvement already obtained in the first case. He had a similar case now under his care which had previously been treated by unnecessarily severe and prolonged splintage, and had developed a certain degree of ischæmia in consequence. He therefore thought that in such cases periods of splintage should alternate with periods of physical treatment.

Mr. BLUNDELL BLANKART remarked that the first case had good scapular movement which might be made use of by arthrodising the shoulder. The little girl, he thought, would benefit by a similar operation to that performed for Erb's paralysis.

In reply Mr. ELMSLIE said he still had the question of performing an arthrodesis of the shoulder under consideration, but up to the present was concentrating his efforts upon attempting to get the patient's hands into such a position that he would be able to feed himself.

Mr. ROTH showed a case of

? Injury to Epiphysis of Left Acromion Process.

The patient, a girl aged 16, complained of pain in the left shoulder which had lasted intermittently for four months and was relieved by resting the arm. On examination at hospital the tip of the acromion was acutely tender, there was marked limitation of abduction, and all movements of the shoulder produced pain. X ray examination showed partial fusion of the left acromial epiphysis with displacement upwards, whereas on the right side the epiphysis remained distinct. The patient improved with rest to the arm in a sling, but pain recurred on using the arm contrary to advice.

Mr. BLANKART suggested a diagnosis of neuritis since there was no history of injury, and he thought he could feel a tender nerve running down over the spine of the scapula.

Tendon Transplantation for Talipes.

Mr. LAMING EVANS showed a girl, aged 9, in whom he had performed a tendon transplantation for paralytic talipes equino-varus. Treatment by manipulations and instruments having failed, he had transplanted the tibialis anticus tendon to the base of the fifth metatarsal, thus converting it into a pronator, with a satisfactory functional result.

Mr. BRISTOW, while complimenting Mr. Evans upon the excellent result obtained, could not agree that the tibialis anticus had now been converted into a pronator. He would rather say that by putting the tibialis anticus into its new insertion the muscular balance of the foot was restored.

MEDICAL SOCIETY OF LONDON.

PERNICIOUS ANÆMIA.

A MEETING of this Society was held on Nov. 13th, with Lord DAWSON OF PENN, the President, in the chair.

Dr. P. N. PANTON introduced the discussion on Pernicious Anæmia. He said that this condition was uncommon, and was almost invariably fatal. During a period of 11 years 117 cases had been collected at the London Hospital. In this disorder we did not know whether we were dealing with a single clinical entity derived from a single underlying factor, or a group of associated conditions with differing factors. Pernicious anæmia was a condition of very severe anæmia which could not be accounted for by the patient's history nor by clinical examination. It was evidently the result of a slow and continuous internal hæmolysis, not of a sudden one as in paroxysmal hæmoglobinuria or in poisoning by arsenuretted hydrogen (AsH_3) gas. This clinical picture was associated with a constant and well-defined blood picture—a low red cell count, with a high colour-index, and the presence of abnormal red cells (more particularly megaloblasts) in the peripheral circulation. This association of clinical state and blood picture defined the disorder and made diagnosis comparatively simple. The clinical state alone might occur in a very different pathological process, as aplastic anæmia, or the blood state alone might occur in poisoning from AsH_3 gas. Achylia, glossitis, fever, and intestinal disturbances were features fairly constantly associated with pernicious anæmia, but associated conditions were rare, with the exception of subacute combined degeneration of the cord. Fatty degeneration of the heart, free iron pigment in the internal viscera, and hyperplasia of the red marrow were found post mortem. Dr. Panton proposed dealing with the following facts emerging from study of the 117 cases admitted to the London Hospital between 1909–1920 inclusive: oral sepsis, achylia, pyrexia, treatment.

Oral Sepsis.

In 13 of the cases studied there was no record of the state of the mouth, and among the other 104 patients in only 21, or in about 20 per cent., was there no past or present dental sepsis. Taking into account the average age (46 years) and the class of patient, the speaker did not consider that the evidence that oral sepsis had any bearing on the ætiology of pernicious anæmia was very striking. It could not be denied that secondary anæmia might result from septic absorption in the mouth, and in this case dental treatment was indicated. If cases with oral sepsis and secondary anæmia with perhaps some poikilocytosis of the red cells were diagnosed as pernicious anæmia, and their oral sepsis were cured, they would recover. In this connexion it should be emphasised that the hæmatological diagnosis of pernicious anæmia from a blood film alone was unjustifiable. Many of the patients in the series considered received the most thorough dental treatment, but Dr. Panton said he had never been convinced that a single case of true pernicious anæmia had been cured as a result of this treatment.

Achylia.

This condition was almost invariably present in cases of pernicious anæmia, and associated with it was an atrophy of the gastric mucous membrane. Achylia was present in 33 of the 35 cases of the series examined for this condition. The achylia of carcinoma might rarely produce a blood picture similar to, although never absolutely identical with, that of pernicious anæmia. The artificial achylia produced by gastrectomy had been stated to have been followed by pernicious anæmia. The speaker had never seen such a case. Pernicious anæmia might occur without achylia; achylia frequently occurred without pernicious anæmia; secondary anæmia might be followed by achylia, and this when once set up, might persist

for life even if the anæmia were cured. Achylia might be regarded as part of a vicious circle. It might result from a hæmolytic anæmia alone, and, further, the gastric atrophy might conceivably be induced in pernicious anæmia by the same toxin which acts upon the blood and on occasion upon the spinal cord. Having been so set up, or having been present beforehand, it might favour the entry of the toxin-producing agent into the system. Thus pernicious anæmia might produce achylia, and conceivably achylia might be an important predisposing factor in pernicious anæmia.

Pyrexia.

Pyrexia (average range 99°–100° F.) was noted in 90 cases. Improvement in the general condition of the patient was synchronous with the return of the temperature to normal. The more acute the case, the more constant was the presence of the fever. This pyrexia associated with pernicious anæmia might suggest an infective origin; but it must be allowed that internal hæmolysis alone would account for the fever.

Some Points in Treatment.

Oral Sepsis.—This condition should be treated, but wholesale extraction of the teeth was deplorable. Dr. Panton thought that vaccine treatment had no value in these cases.

Achylia.—He thought that the administration of an artificial gastric juice should be adopted in all cases with achylia.

Splenectomy.—This had been practised extensively during the last ten years. It was claimed that this operation prolonged life, but the after-results of a series of splenectomies published in America showed that the length of life was comparable with that seen in the London Hospital series of cases, where the operation had only been performed once.

Blood Transfusion was only advisable where it was desired specially to prolong life. When the transfused blood was used up, more had to be given; Dr. Panton had been unable to detect any real recovery of the patient's blood-forming tissues after transfusions.

Arsenic.—Either organic or inorganic had a well-established reputation in the treatment of pernicious anæmia, for it was common experience that patients desperately ill improved in the most remarkable manner under the influence of arsenic. A peculiarity of the action of the drug was that when patients were going downhill while taking an inorganic preparation they would rally when injections of arsacetin or salvarsan were substituted. The converse also occurred. This peculiarity was responsible for the stream of new remedies. Patients were very frequently first seen with a red cell count of about 1,000,000 per c.mm., and even if seen and treated early the blood count was apt to fall to this figure before any improvement took place. Some cases, indeed, appeared to find a certain level and maintain it untreated for years. It would therefore appear that the morbid process could strike a certain balance, which, if depressed, tended to swing up again. Arsenic had no effect during the balance period, but if given during a depression might be unduly credited for the upward swing. In support of this Dr. Panton quoted a case treated on the first occasion with arsenic with great improvement. Readmitted on a later occasion the patient made an equally great improvement without any drug treatment at all.

Certain Allied Conditions.

The underlying pathological process in pernicious anæmia was generally accepted to be internal hæmolysis, although Ashby and Whipple had produced some evidence against this view. The blood picture could be simply explained, for if blood were destroyed internally, the hæmoglobin was retained and a primary anæmia with a high colour-index followed. Dr. Panton passed on to consider other clinical states associated with internal hæmolysis and primary anæmia. Bothriocephalus anæmia was stated to produce an identical blood picture, but according to Pappenheim the characteristic glossitis of pernicious anæmia was absent. Occasionally a very acute anæmia developed late in pregnancy or during the puerperium, independently of sepsis or of severe hæmorrhage. The blood picture of these cases resembled that of pernicious anæmia, but the clinical features differed in the acuteness of onset, and the completeness and permanence of the recovery. It would appear as if the same toxic state, which might lead to eclampsia and renal and hepatic damage, might also produce hæmolytic anæmia. Chemical agents, such as ricin, also produced a similar blood picture. AsH_3 poisoning, which occurred in submarines during the war, produced the blood picture of pernicious anæmia, with deep jaundice and hæmoglobinuria. If the patient survived a few days complete recovery usually took place. Paroxysmal hæmoglobinuria resulted from a series of different conditions in which internal hæmolysis occurred, but in which the hæmoglobin was shed and a secondary anæmia resulted. Hæmoglobinuria occurred from such variable causes as blackwater fever, the injection of a hæmolytic serum or an incompatible blood transfusion, and the inhalation of arsenuretted hydrogen gas. There were three types of obscure hæmolytic anæmias—an acute form occurring in young people and ending fatally in a few months usually considered to be cases of acute pernicious anæmia; a second type resembling the acute state of AsH_3 poisoning and providing the link between paroxysmal hæmoglobinuria and pernicious anæmia, showing the blood picture of the latter combined with attacks of jaundice and hæmoglobinuria. These cases ran a very chronic course. A third and very rare type was that in which the hæmolysis appeared to occur in the skin. One such case presented the skin pigmentation of a negro, combined with the blood picture of pernicious anæmia. Later the skin became lighter in colour, but the blood picture has persistently shown a severe anæmia with nucleated red cells, but on the whole a low colour-index. A consideration of the associated conditions led to the view that pernicious anæmia was only one of numerous conditions in which hæmolysis occurred, and that there were probably several conditions of differing ætiology included under the title.

Rôle of Achlorhydria in Pernicious Anæmia.

Dr. A. F. HURST said he was becoming more and more convinced that constitutional peculiarities or diatheses played an important part in the production of disease, and that pernicious anæmia was an excellent example of disease dependent upon diathesis. Achlorhydria (which was an inborn error of function) was, he thought, almost invariably the predisposing cause of pernicious anæmia, for the recently introduced fractional test-meal showed that in pernicious anæmia free HCl was absent from the gastric secretion throughout digestion. It had been suggested that the achlorhydria was secondary to the anæmia, but he had now collected 12 cases in which the achlorhydria had preceded the anæmia by periods varying from 1 to 12 years. Moreover, the achlorhydria was found in the early stages of the disease and remained complete during remissions or apparent recovery. Finally, there was no constant change in the gastric secretion in other forms of anæmia. It was the absence of free acid that was, in all probability, the predisposing factor. In many cases the achlorhydria was due to constitutional achylia gastrica, which, as T. I. Bennett and J. A. Ryle had shown, was present in 4 per cent. of normal young men; but this was not invariably so, for he had ssen a case of pernicious anæmia associated with achlorhydria due to alcoholic gastritis, and he also knew of six cases where the complete achylia due to total gastrectomy for cancer was followed by pernicious anæmia. According to Faber, pernicious anæmia occurs in 10 per cent. of individuals with achlorhydria. Dr. Hurst believed that this 10 per cent. were the victims of oral sepsis, with possibly some additional factor such as vulnerability of the blood or bone marrow; streptococic were swallowed which were not destroyed as in the

normal individual by the acid gastric secretion. They had found *Streptococcus longus* in the duodenum of each of 12 cases of pernicious anæmia and subacute combined degeneration of the cord. Achlorhydria favoured infection of the intestine and also by delaying the digestion of protein allowed an undue proportion of protein to remain in the lower ileum, in which it could undergo bacterial decomposition with the possible production of toxins. One of these toxins might be hæmolytic, and another, the neurotoxin, repsonsible for subacute combined degeneration of the cord. Constitutional achylia gastrica was now, owing to the frequent performance of fractional test-meals, being discovered often. All patients exhibiting this condition should be regarded as potential cases of pernicious anæmia, and should therefore take sufficient hydrochloric acid with every meal to produce the normal gastric acidity (in most cases 1½ to 2 drachms of dilute hydrochloric acid were required), and should pay special attention to the teeth. When pernicious anæmia was already present, the administration of hydrochloric acid and radical treatment of oral sepsis should be combined with the use of a vaccine prepared from the organism in the patient's own duodenum. In severe cases he was inclined to recommend transfusion, and possibly splenectomy.

Dr. ARTHUR MAITLAND-JONES gave some figures collected from the 117 cases already referred to by Dr. Panton. The records were incomplete, but showed that the average number of remissions in the disease was two, although rarely there were as many as five or six, and the average duration of each remission was six months. During a remission the blood count rose from 1 million up to 2½ or very rarely 3½ millions. It was remarkable that with only a slight improvement in the blood count the patient would profess himself greatly relieved. This, it had been suggested, was due to the increase in blood volume rather than in cells. Eight of the cases were still alive, one at 17, one at 14, and one at 8 years after the commencement of the disease. The first had been exhibited to the society as an apparent cure. He now presented no symptoms, and had a red cell count of 5,200,000. When in the London Hospital, 13 years ago, his blood count was only 1,500,000, and he had complete achylia.

Dr. CECIL PRICE-JONES showed diagrams indicating the great variation in the size of the red cells in pernicious anæmia, whereas normal red cells showed comparatively little variation. The essential element in the blood picture of pernicious anæmia was the production of a large red cell which was easily hæmolysed, and when this hæmolysis occurred there was a reaction which resulted in the production of small red cells.

Dr. J. J. CONYBEARE, who had with Dr. J. M. H. Campbell collected the records of all the cases at Guy's Hospital during the period 1909–22, said that the figures showed that the disease was becoming relatively more frequent. It was difficult to be sure that the gastro-intestinal symptoms of pernicious anæmia were not due to the administration of arsenic, but in this series such symptoms arose in 35 per cent. of cases before any arsenic had been given. Achlorhydria had been observed in all the cases in which a test-meal had been performed with one exception—a case which appeared to have recovered. Pigmentation occurred in the skin in 12 per cent. and in the mouth in 5 per cent. of cases, and was apt at times to make the diagnosis from Addison's disease difficult.

Dr. L. TIDY referred to a unique case recently seen at St. Thomas's Hospital. On admission the blood picture was that of aplastic anæmia, which changed after treatment with arsenic to that of pernicious anæmia. Post mortem the bone-marrow of the femur showed the macroscopic and microscopic appearances in one-half of aplastic and in the other half of pernicious anæmia, with a sharp line of demarcation. He could not agree with Dr. Hurst as to the importance of achlorhydria as an ætiological factor, since it occurred together with a blood picture similar to that of pernicious anæmia in two diseases which were curable—bothriocephalus anæmia and sprue.

Dr. F. J. POYNTON pointed out that the anæmia gravis of childhood, which many thought to be aplastic, presented many resemblances to pernicious anæmia in its mode of onset, and the reduction of red blood cells, although the colour-index was always low. That such cases were not true aplastic anæmia was shown by the fact that under treatment the red cell count would often increase by 3 millions in a few weeks. This disease also showed the remissions so characteristic of pernicious anæmia, and reacted similarly to treatment only during the upward swing.

Sir P. BASSETT-SMITH said that sprue differed from pernicious anæmia in having a low colour-index.

Dr. G. RIDDOCH discussed the associated spinal cord lesions. In 84 per cent. of these cases degenerative changes were found in the postero-lateral columns extending often from the cervical to the lumbar region. The changes were most marked in the regions supplied by the pial arteries. Subacute combined degeneration of the cord might occur without the blood picture of pernicious anæmia. Similar changes in the cord occurred in ergot poisoning and pellagra, both diseases in which the toxin was probably blood borne.

Reply.

In reply Dr. PANTON said he could not agree in toto with Dr. Hurst as to the rôle of achlorhydria, for he had seen cases of secondary anæmia with achlorhydria and also knew of three cases of true pernicious anæmia with free HCl in the test-meal. He could not avoid thinking that the cases of pernicious anæmia stated by Dr. Hurst to have occurred after gastrectomy for cancer were examples of mistaken diagnosis—he had made a similar mistake himself upon at least one occasion. As regards anæmia gravis of children he thought that the low colour-index constituted sufficient evidence that it was not true pernicious anæmia.

At the beginning of the meeting cases were shown by Dr. MAITLAND-JONES and microscopic preparations by Dr. PANTON and others.

CARDIFF MEDICAL SOCIETY.

PUERPERAL INFECTION MORTALITY IN WALES.

A MEETING of this Society was held on Nov. 7th, when Prof. E. J. MACLEAN, who presided, delivered his presidential address with this title. He traced the historical basis upon which our present knowledge of puerperal infection rests, and discussed the questions of definition and classification. He proceeded to discuss the frequency and distribution of puerperal infection. In 1910 attention was drawn to the fact that in the British Isles during the previous 40 years the mortality from puerperal infection had but slightly diminished, notwithstanding the revolution which had occurred in surgical practice. The lying-in hospitals only participated in the betterment so far as midwifery was concerned, and in these institutions the mortality had been reduced to a minimum. Taking a quinquennial period of 70 years ago, the puerperal death-rate from all causes was 4·9 per 1000 births, as compared with 4·2 for a similar period of 16 years ago, and deaths from puerperal infection account for 50 per cent. of these rates. The Registrar-General's report for 1920 makes reference to the tale and toll of the intervening years. In 1920 the number of deaths assigned to pregnancy or childbirth corresponded to a rate of 4·12 per 1000 births, as against an average rate of 3·78 in the 10 years immediately preceding, and 4·12 for 1919. Prof. Maclean pointed out that the lowest level reached was 3·55 in 1918, so that the increase to 4·12 in 1919 and 1920 was sudden as well as considerable. When distinction was made between deaths ascribed to septic and to other causes it emerged that the increase was almost entirely due to sepsis, the rate for which

was higher in 1919, and still more so in 1920, than in any of the preceding ten years. It might be significant or merely coincidental that the erysipelas mortality of 1920 was the highest since 1915. The chief medical officer of the Ministry of Health in his report for 1921 was able to indicate some improvement, the inclusive rate being 3·9 per 1000 births, as compared with the 4·1 already quoted for the two previous years, but expressed grave concern at the fact that these 3323 mothers lost their lives on account of childbirth, and stressed the importance of antenatal supervision and a well-trained service of midwives.

High Puerperal Mortality in Wales.

A recognised authority on the geographical distribution of puerperal infection in England and Wales, the late Dr. William Williams, found that the puerperal septic death-rate varied from 1·4 to 3 per 1000 in different centres, the maximum being reached in Lancashire and Wales, whilst many of the counties were represented by a figure below 1·4. Deaths from accidents in childbirth, however, are most numerous in agricultural districts with a scattered population, and reach the minimum in London and its surrounding counties. This is generally attributed to the greater availability of skilled assistance in emergencies in the more densely populated districts. Dr. Williams studied in detail the distribution of mortality in South Wales, and found that infection occurred most frequently amongst women attended by ignorant or untrained midwives, and that density of population, climatic conditions, and even the presence of zymotic diseases had little influence.

Prof. Maclean said that in every authoritative report dealing with the matter attention was drawn to the exceptionally high puerperal mortality among women in Wales. In one period when the average mortality from childbirth and childbed in London was 3·9 per 1000 births and in England and Wales 4·7, the figure for South Wales was 6·1 and for North Wales rather higher still. And again, in the puerperal mortality census for England and Wales 1911–14, when the mortality rates per county were indicated by degrees of shading, there were only two *black* counties, both of which were in Wales—Cardigan and Merioneth; the qualification of a *black* county being that as many as 8·9 mothers died per 1000 births. In the latest report (1920) of the Registrar-General the figures show that in the maternal mortality rate per 1000 children born alive, Wales is definitely higher than any or all parts of England, and therefore than the combined rate for England and Wales. This applies to county boroughs (5·79—England and Wales, 4·42), urban districts (5·27—England and Wales, 4·46), and rural districts (5·77—England and Wales, 4·54), the consolidated Welsh rate being 5·52, as against 4·33, the average for England and Wales. For puerperal deaths due to sepsis the Welsh rural districts still hold, unfortunately, an outstanding position in the whole of England and Wales (2·22 per 1000 live births, as against England and Wales 1·68). There could be no doubt that many cases of puerperal infection were not notified, and that this was especially so in the rural districts.

Many facts and figures might be furnished to support the view that in Wales the subjects of puerperal mortality, and especially of puerperal infection, afford an outstanding problem which all bodies and persons executively concerned should strive to solve. Prof. Maclean believed that great betterment would come along the lines recommended in the second report of the Welsh Consultative Council, but meanwhile much could be done by the intelligent and conscientious observance of preventive measures and by the harnessing of the new facts which evolved from laboratory and clinical research.

Prophylactic Measures.

The range of prophylaxis must, he said, include pregnancy, labour, and the lying-in period. During pregnancy attention should be directed to the general health, urine analysis, personal hygiene, and the careful treatment of erythematous or eczematous conditions of the vulva, vaginitis or fistula-in-ano, &c. Particularly in primigravidæ a systematic pelvimetric examination was of the greatest importance. During labour, the selection and preparation of the lying-in room and the exclusion of all persons suffering from diseases, such as tonsillitis or any form of septic infection, called for attention. The arrangement of the bed and the preparation of the patient, her clothing, and detailed disinfection of the vulva as the centre of the "field of operation," were of the utmost value. As regards vaginal douching this practice in normal labour was unnecessary and might be harmful, the essential point being to carry out complete antisepsis of the vulva. Too much importance could not be attached to the disinfection of the hands and the intelligent use of rubber gloves. The number of vaginal examinations during labour should be limited by real requirement, and the same comment applied to the number of obstetrical operations, including not only instrumental interference, but the most dangerous of all obstetrical operations, the manual removal of the placenta involving, as it did, the definite risk of the direct inoculation of organisms on the placental site. There were instances, of course, where that risk must be accepted, as, for instance, in post-partum hæmorrhage, or cases where full time had been allowed and where the various methods of expression had been thoroughly tried without effect. The retention of a small portion of membrane within the uterine cavity did not in itself justify manual exploration. Vaginal or intra-uterine douching after normal labour was not called for, but should be practised only when there was reason to surmise that by hand or instrument organisms had been introduced. The repair of injuries produced during delivery should be undertaken with the fullest regard to aseptic and antiseptic precautions. After delivery the care should not be relaxed. A careful ritual observed during labour was too often abandoned forthwith, whereas the maintenance of asepsis was of prime importance, and this involved the carrying out of general and local measures to that end. Especial danger attached to careless sponging of the vulva, and, as far as possible, all manual interference with the vulva or vaginal orifice during the early days of the puerperium should be avoided. Improvement could only be brought about by a full appreciation of all that was known of the ætiology of the disease, and an adequate sense of the responsibility on the part of all those brought into relation with the lying-in room.

Demonstration of the Anti-Bactericidal Properties of Colloidal Silica.

In the unavoidable absence of Prof. S. L. CUMMINS, a demonstration of recent work done in the Tuberculosis Department of the School of Medicine and the Welsh National Memorial Association was conducted by Dr. W. H. TYTLER. Silica in colloid form had been shown to possess a marked power of inhibiting the action of "complement," and thus preventing the lysis and destruction by bacteria of the blood fluids. Specimens were placed upon the table illustrating how completely the lytic effect of fresh blood upon typhoid bacilli was stopped by the presence of colloidal silica. In one series of preparations, serial dilutions of a typhoid broth culture had been mixed with an equal volume of sterilised normal salt solution, and from this mixture a measured volume had been added to an equal amount of fresh normal human blood, the preparations being then placed in the incubator at 37° C. for 1 hour and 40 minutes. At the end of that time the whole contents of each tube were transferred to the surface of a trypsin agar slope and incubated over night. Very few colonies had developed on the agar, showing that the bacilli had been killed by the lytic action of the blood. In the next series similar serial dilutions of a typhoid broth culture had been mixed with an equal volume of silica colloid, and afterwards equal

volumes of the mixture and fresh human blood prepared and treated as in the former case. In this series the trypsin agar slopes were covered with a thick growth of typhoid bacilli, showing that in spite of the presence of the lytic substances of human blood the bacteria had been preserved from destruction during the period of 1 hour and 40 minutes' contact at blood temperature. That this prevention of lysis was due to interference with "complement" was proved by the next series of tubes in which the complete inhibition of lysis of sensitised red blood corpuscles by the presence of silica colloid was demonstrated. These observations, perhaps, were regarded as possibly having a bearing on the action of silica in leading to the establishment of bacterial diseases in the tissues, to which attention had recently been drawn by W. E. Gye and E. H. Kettle [1]; while the inhibition of cytolytic activity noted might be an explanation of the fact, observed by Mavrogordato in South Africa, that macrophage cells containing ingested silica dust were protected from "autolysis" and digestion in the lymph spaces.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

A MEETING of this Society was held at Liverpool on Oct. 20th, with Mr. HAROLD CLIFFORD, the President, in the chair.

EXHIBITION OF CASES AND SPECIMENS.

Dr. FLETCHER SHAW (Manchester) described a case of

Occlusion of the Rectum following the Administration of a Simple Enema.

The patient was a primigravida to whom the midwife administered a simple enema at the beginning of labour. There was some difficulty in inserting the nozzle and considerable pain was experienced as it was pushed in with force, with still greater pain when the enema was injected. Very soon afterwards the perineum became very swollen and red. At the end of 24 hours, when a doctor was called in, there was so much swelling that a vaginal examination could not be made and the parts were so red that erysipelas was diagnosed. The patient was delivered in a side ward of St. Mary's Hospital and then sent to the fever hospital with this diagnosis, and later home with the recto-vaginal septum completely sloughed away and a large sinus in the right ischio-rectal fossa. Eventually the rectum closed down to a mere band of fibrous tissue and the patient is now condemned to a permanent colotomy opening. It seemed probable that the nozzle of the enema syringe was detained by a fold of rectal mucous membrane, and the force used in inserting it further pushed the nozzle through the mucous membrane so that part of the injection was given into the peri-anal tissues. This would account for the early swelling, the further swelling and redness being caused by infection of this area from the rectum.

Dr. LEITH MURRAY (Liverpool) reported a case of

Unsuspected Pregnancy

in a woman of 24, seen by him in 1920 at the request of Dr. A. C. Ransome. Twenty-nine hours previously she had been delivered of a 6½ lb. child apparently at term. She had been happily married for three years and had during most of that time lived in Newfoundland, where she developed enteric fever. As a result of this acute illness she lost 3 st. in weight, but during recent months was pleased to find that she was, as she thought, picking up. Her menses had always been scanty and infrequent and there was complete cessation for some time following the enteric fever. She gave, however, a very precise history of having had a more or less monthly loss throughout the whole of her nine months of pregnancy, of such duration and quantity as to lead her to believe that she was menstruating. She had had no vomiting, had felt no movements, and had no idea that she was pregnant, though between the seventh and eighth months she noticed that her abdomen was getting very big. On July 28th, after dining out, she complained that something had disagreed with her, and she still had pains in her abdomen in the morning. The abdominal pains increased in severity and at 10.30 A.M. she discovered that delivery was imminent and delivered herself unaided at 11 A.M. The placenta was delivered normally, but there was considerable bleeding thereafter. The presence of Dr. Murray was necessitated by rather severe lacerations of the vagina which were leading to continuous oozing. These were sutured under an anæsthetic and healed well. The child's palate was scored in several places by the mother's nails in her attempts to expedite delivery. It was noticeable that there were very few striæ on the abdomen. She appeared to be rather big-boned but certainly not fat. Her height was about 5 ft. 6 in. She was a well-educated and intelligent girl obviously distressed at the lack of provision for her offspring.

Dr. MURRAY also described

A Case of Simulated Disease.

The main interest in the case lay in the fact that a girl of 20 should have succeeded, by producing diapers artificially stained, in deceiving her mother, her doctor, and a consultant into believing that she was menstruating excessively. She was brought to Dr. Murray on August 1st, 1919, with the request that he should remove the uterus. Her periods, which began at 15, were reported regular (3/28) until she went to school at 16. Three months of amenorrhœa ensued, followed, the report went, by severe and prolonged periods ever since. For months at a time she was supposed to be only a few days free from loss in each month. She had been curetted on April 25th, 1919, without any improvement and had been given thyroid, hamamelis, calcium lactate, and ergot. She was a slim child, pale but not excessively so. She was highly neurotic, and rectal examination, which showed a normal pelvis, was only made with extreme difficulty. As she was not bleeding on the day when seen, Dr. Murray asked for a diaper to be sent him. This was received on August 14th and presented an appearance remarkably like menstrual staining. There was, however, no trace of blood detectable by the benzidine test. Two other specimens of blood passed into the chamber were received on August 16th and 18th and were sent for analysis. A report was received that both specimens were similar in composition and undoubtedly consisted of urine to which some colouring matter analogous to cochineal had been artificially added. When challenged she admitted having on one occasion only used cochineal from the kitchen cupboard to colour the diaper.

MANCHESTER MEDICAL SOCIETY AND LIVERPOOL MEDICAL INSTITUTION.

A JOINT meeting of these Societies was held in the University of Manchester on Nov. 1st, Sir WILLIAM MILLIGAN being in the chair.

Dr. R. W. MACKENNA (Liverpool) read a paper on the

Relation of the Ductless Glands to some Affections of the Skin.

He began by pointing out that the subject was one beset by difficulties, but he believed that the elucidation would come from clinical observation rather than from laboratory experiments. After dealing with the definite cutaneous changes associated with hypo- and hyperthyroidism he showed how thyroid substance had been administered, more or less empirically, in psoriasis, ichthyosis, eczema, lupus, keloid, sclerodermia, and other diseases of the skin, sometimes with striking benefit, but sometimes with little apparent result. As to the other ductless glands, he spoke of the influence of the parathyroids on calcium mobilisation; the action of the suprarenals in influencing pigmentary changes in the skin, and their possible relationship to

[1] THE LANCET, 1922, ii., 855.

acanthosis nigricans and neuro-fibromatosis, and finally he dealt with the internal secretions of the gonads, more particularly with reference to their effect on the growth of hair. Hirsuties in women he definitely correlated with diminished ovarian secretion.

Dr. JOHN HAY (Liverpool) offered some observations on a case of

Angina Pectoris,

in which the electrocardiogram showed indications of a right bundle lesion, and in which the dominant site of the pain was epigastric. He discussed the significance of abnormal electrocardiograms in patients suffering from angina, and the view that an electrocardiogram showing marked deviation from the normal Q-R-S complex is an indication of cardiosclerosis. In the case described the electrocardiogram was of the type indicating some interference with the right branch of the bundle. Examination revealed no organic block, but there was some increased fibrosis and atheroma of the coronaries. Of 25 anginal patients who were electrocardiographed 10 showed definite abnormality in the Q-R-S complex. Of these 8 died, as compared with 15 anginal patients with normal electrocardiograms, of whom 6 died during a similar period of time. From these and other figures the justifiable inference is that in angina pectoris an electrocardiogram showing branch bundle lesion or arborisation block makes the prognosis much graver. Reference was made to those cases in whom epigastric pain is the dominant symptom. Numbers were given showing the ratio of incidence to be 16 epigastric anginas in a total number of 288 patients. In the one patient before-mentioned the pain was primarily epigastric in site, but examination revealed no lesion of the liver, gall-bladder, or gastro-intestinal tract to account for the pain. Special attention was drawn to the importance of angina minor, the earlier manifestations of which are unobtrusive but significant, more particularly the substernal oppression or feeling of substernal distension which is induced by effort and which disappears with rest.

Mr. T. C. LITLER JONES (Liverpool) discussed the

Indications for Cholecystenterostomy.

His usual practice was to anastomose the gall-bladder to the duodenum, and in one case where a fistula was found between the gall-bladder and the colon the fistula was re-formed with satisfactory results. This operation was of considerable value in relieving the symptoms in cases of malignant disease of the head of the pancreas. In cases where it was difficult to remove stones from the common duct he had found the transduodenal route a good means of access. The duct ran for about half an inch in the wall of the bowel and could be safely incised for this distance in removing stones. It might be difficult to find the papilla, but by using a probe or pressing on the duct above it could generally be identified. The pains so commonly seen after cholecystectomy might be attributable to the constant flow of bile into the duodenum due to the relaxation of the sphincter of Oddi.

ULSTER MEDICAL SOCIETY.

THE opening meeting of the session was held in the Medical Institute, Belfast, on Nov. 2nd.

Dr. R. J. JOHNSTONE, the President, selected as his subject

Some Aspects of Pain met with in Gynæcological Practice.

He emphasised the importance which the distribution of the symptom not seldom had in serving as a guide to correct diagnosis. The skin registration of pain arising from disease of the internal female genital organs was briefly reviewed, and the sharp differentiation of the body and cervix of the uterus commented on. The question of "ovarian pain" was then discussed. It was pointed out that while in some cases the symptom afforded an excellent indication of the organ at fault, colourable imitations of it were produced by lesions which had nothing whatever to do with the ovary. After a review of several varieties of painful cyst of the ovary the speaker then discussed the subject of ovaritis, and expressed his dissent from the view that a primary ovaritis, apart from disease of the genital passages or peritoneum, or possibly as the result of metastasis, was a pathological possibility. He then analysed the mode of causation of pain in some uterine infections. In the case of retroversions he was inclined to regard all painful retroversions as falling into two categories—those in which the uterus was the subject of more or less chronic inflammation, and those in which the uterine supports were relaxed and there was a consequent commencing descent. The importance of the cervix as a site of painful lesions was emphasised; the President reiterated the warning that cancer, so long as it is confined to the cervix, causes no pain.

Some remarks were made on the cause of pain in ruptured tubal pregnancy. The view was advanced that the pain was due to irritation of the peritoneum by the effused blood, and it was pointed out that as the blood first collected in Douglas's pouch, this peritoneal irritation caused extreme tenderness on pressure in the posterior fornix during the course of a vaginal examination, a valuable means of distinguishing the condition from other causes of acute abdomen.

TUBERCULOSIS.

The National Association for the Prevention of Tuberculosis.

THE report of the Council, presented at the twenty-third general meeting held on Oct. 23rd, announces that H.R.H. the Prince of Wales has consented to become the President of the Association, in place of the late Lord Balfour of Burleigh. The Council also announces that, with sincere regret, they have accepted the resignation of Dr. J. J. Perkins as honorary secretary. It would be impossible to overestimate the value of his 17 years of service, and the Association is to be congratulated on having elected him to a vacancy on the Council. The pièce de résistance of the present report is the Association's Burrow Hill Colony at Frimley. In the autumn of 1917 an appeal was made for £50,000 to start a farm colony for tuberculous soldiers and sailors. By Sept. 25th last, over £42,000 had been received. The property purchased had no buildings and consisted of 118 acres. In view of the cost of building, permanent houses were not erected, and army huts were converted to the requirements of open-air treatment. Three pavilions have been erected, containing 80 beds, 20 of which are for sanatorium cases and 60 for trainees—i.e., men who have passed through a sanatorium and are ready to learn a new vocation. The colony is not intended as a permanent settlement, but rather for the continuation of sanatorium treatment and training for a period of one to three years under medical supervision. As the Council have no guarantee that they will receive further Government aid, and the current payment made by local health authorities is quite inadequate, annual subscribers are cordially invited to assure the future of the colony. The scheme for re-training tuberculous ex-Service men has already been in operation for several years, and it would be well if, at an early date, the results so far achieved in every case were to be published.

The Relation of Gas Poisoning to Tuberculosis.

Independent confirmation of the views of Dr. T. E. Sandall and Dr. A. Abrahams (THE LANCET, Oct. 21st and 28th) as to the rarity with which gassing provokes pulmonary tuberculosis is to be found in a paper by Dr. J. L. Hankins and Dr. W. C. Klotz in the *American Review of Tuberculosis* for September, 1922. Their observations concern 166 young adults who were treated at the Johnson City National

Sanatorium, and who gave a very definite history of gassing, for which they had been treated in hospital for a period of 20 days or more. It was thus evident that slight cases of gassing were not included in this material. Though clinical tuberculosis was diagnosed in 66 per cent., there was only one case in which tubercle bacilli were found in the sputum. None of these patients had died, and in none were there signs of advanced tuberculosis. In marked contrast to their functional disturbances, which were considerable, was the slight degree of tuberculous involvement. The symptoms and signs were singularly uniform. Lack of energy, incapacity for sustained physical effort, shortness of breath, cough and expectoration with, in many cases, asthmatic symptoms, were prominent. Inspiration was jerky, expansion of the lungs incomplete, and the chest comparatively rigid. The respiratory sounds were often harsh over the upper lobes, while they were distant over the bases, which were dull on percussion. The X rays showed sharply defined but not beaded bronchial markings, and the ground glass haziness of chronic pleural thickening. The authors consider that this chronic peribronchitis resulting from the necrotic action of irritating gases on the bronchial mucous membrane must be regarded as permanent, and as it greatly handicaps its victims it qualifies them for a high compensation rating. But as an activator of tuberculosis gassing does not appear to play an important part.

The Campaign Against Tuberculosis in Lancashire.

Lancashire's reputation for being in advance of the rest of England is well deserved if its tuberculosis work is a true sample of its public health standard. The report of the central tuberculosis officer of the Lancashire County Council, Dr. G. Lissant Cox, covers the year 1921 and deals with many different aspects of the campaign. The report, and the organisation of which it is the mouthpiece, might well serve as models for other counties. The provision of post-graduate instruction is an illustration of the spirit in which the campaign is conducted. Many authorities are more concerned with teaching their tuberculosis officers to be thrifty housewives rather than up-to-date physicians, and their instructions suggest that the tuberculosis official should, above all, learn to pare his patients' cheese. In Lancashire, however, arrangements have been made for every tuberculosis officer to take a post-graduate course in non-pulmonary tuberculosis at Alton, and already five tuberculosis officers have completed this course. With regard to the failure of practitioners to notify tuberculosis, an instructive analysis has been prepared to show the chief reasons for this omission in 81 deaths. It was found that in 8·6 per cent. of the deaths, there was apparently no reasonable excuse for non-notification. More significant was the discovery that in 42 per cent. of the deaths notification was not made owing to a misunderstanding of the tuberculosis regulations, or to the belief that the case had already been notified. The report proceeds: "It would be much better, in the public interest, that doctors be encouraged to notify every case coming under their notice, even at the expense of some duplicate notifications, rather than that the present misunderstanding should continue." It is curious that Dr. Heitmann, chief tuberculosis officer for Norway, has found exactly the same flaw in the system of notification in Norway that Dr. Cox has discovered in England, and both offer the same remedy, that a doctor notifies every tuberculous patient, whether the patient has already been attended by another doctor or not. Notifications being nominative, the risk of overlapping is negligible. Other instructive points in Dr. Cox's report are the efficiency of the coöperation between practitioners and tuberculosis officers and the decline of the death-rate from pulmonary tuberculosis, which reached a new record in 1921, when it was only 0·73 per 1000.

Recent Changes in Age-Type of Tuberculosis.

In the *Statistical Bulletin* of the Metropolitan Life Insurance Co., New York, Dr. John Brownlee's classification of pulmonary tuberculosis in age-types is challenged. "Much evidence against Brownlee's hypothesis has accumulated in the past few years, and nothing, to our knowledge, has appeared to substantiate it." It is pointed out that if there were fundamental stability in the age-types of pulmonary tuberculosis no rapid changes could be expected within a decade in type-forms of the disease in populations where only changes in environment and hygiene had taken place. During the past decade the type of age-incidence of pulmonary tuberculosis has undergone profound alterations among white male wage-earners insured in the company. Not only has the maximum death-rate in this class been depressed 59 per cent. in 11 years, but the age at which the maximum death-rate occurs has moved forward from 38·8 years to 44·8 years. Instead of the sharply peaked curve of 1911 there was, in 1921, a scarcely distinguishable peak at the age-group 40 to 44 years, with a decidedly horizontal tendency of the line beyond 45 years. "Such changes in the contour of the curve in so short a period as 10 years would seem to disprove the assumption that tuberculosis is not one disease, but several."

Coming Tuberculosis Legislation in Switzerland.

In the *Schweizerische medizinische Wochenschrift* for Oct. 19th there is a survey by Dr. Hans Hunziker of the draft of the new Swiss tuberculosis law. The outstanding and, to a certain extent, novel feature of this law is its explicit admission that if the liberty of the tuberculous individual is to be curtailed for the benefit of the public, it is incumbent on the public to compensate the individual. The draft also deals with educational propaganda and scientific research, two most important measures which in most countries have hitherto been left to unofficial bodies and individuals. Provision is also made for the organisation of various institutions. Many other measures are dealt with, but in importance they are obviously secondary to the guiding principle that it is the community and not the individual sufferer who must meet the financial cost of tuberculosis.

"SAFETY FIRST."

RISKS TO LIFE IN NEW YORK CITY.

FROM Oct. 8th to 14th this year was "Safety Week" in New York City and the organisation of this demonstration is a striking illustration of the energy with which Americans, especially in the larger cities, throw themselves into special and spasmodic efforts for combating an outstanding evil. The demonstration has been organised by the Safety Institute of America, an organisation largely run by the various accident and other insurance societies in the United States; and during the special week every method of publicity was utilised to bring home to the general public the avoidable character of most accidents and the means for their avoidance. The object of the campaign is to "make New York the safest city in the country." To do this will be a great feat; for in the year 1921 out of the total claims paid by the Metropolitan Life Insurance Company in the greater city of New York 5·8 per cent. were on account of accidental deaths. During that year, furthermore, as many children died from accidental causes in New York as from the four principal communicable diseases of children combined. The American national statistics indicate the urgent need for strenuous efforts to minimise the causes of accidents. In the combined experience of 50 American cities in 1921 the annual death-rate per million living from injury by automobiles was 155, and from all means of vehicular traffic 226. No exactly comparable figures are available for England and Wales; but in 1920 the death-rate per million persons in this country was 94 from accidents occurring in connexion with vehicles and horses, a death-rate nearly seven times as high as that from enteric fever. The number of traffic accidents could be still further reduced by more rigid enforcement of traffic regulations; but to secure the maximum good the watchful and intelligent coöperation of every person is necessary. The same remark applies to other forms of accident; and the bringing of accidental deaths, whether industrial or non-industrial, to an increasing extent within control is an important branch of applied preventive medicine to which increased public attention is most desirable.

Reviews and Notices of Books.

CLINICAL AND OPERATIVE GYNÆCOLOGY.

By J. M. MUNRO KERR, M.D. Glasg., M.B., C.M., F.R.F.P.S., Professor of Obstetrics and Gynæcology, Glasgow University (Muirhead Chair); Gynæcological Surgeon, Royal Infirmary, Glasgow. Oxford Medical Publications. London: Henry Frowde and Hodder and Stoughton. 1922. With 450 illustrations in the text and 12 coloured plates. Pp. 848. £2 10s.

THIS book makes no pretensions to be an exhaustive treatise. It is an attempt to present the subject of gynæcology in a clinical form as far as this is possible in writing. The clinical part is enriched with a large number of case records. Anatomical description has been cut down to the minimum, macroscopic pathology alone is given. The first chapter deals with ætiology, symptomatology, and the general principles of treatment. This is followed by a short chapter on topographical anatomy, then a useful summary of the examination of patients, followed by a practical chapter dealing with the physiology of the reproductive organs. Under disorders of function the various abnormalities of menstruation are described. An account of nervous disorders in relation to abdominal and pelvic disease is contributed by Dr. Ivy Mackenzie, and an excellent section on the development of the reproductive organs by Prof. T. H. Bryce. The important part played by infective processes in the development of pelvic disease is rightly laid stress upon, and Dr. David Watson contributes a chapter on venereal disease of the female genital tract. It is interesting to note the stress laid by the author on the treatment of so-called endometritis of the uterus by disinfection rather than by curettage; in this he is in accord with the teaching of most modern gynæcologists who have long been accustomed to condemn the curette as a means of treating infection of the uterus, useful as it is in cases of simple hæmorrhage not due to infective processes.

We notice that the author writes enthusiastically in favour of X rays in the treatment of cases of subinvolution of the uterus complicated by hæmorrhage, but he utters the warning that in all such cases an exploratory curettage should be carried out so as to exclude with certainty the possibility of carcinoma of the body being present. The use of radium in these cases is equally satisfactory and even simpler. We are glad to see that attention is called to the extreme tolerance exhibited by the fibromyomatous uterus to pregnancy; as Prof. Munro Kerr remarks, this was pointed out by Pinard many years ago. The chapter dealing with malignant disease of the uterus is a good one, as is that on affections of the Fallopian tubes. It is particularly in such a condition as ectopic gestation that records of cases can be useful, and those which are given to illustrate points in this chapter are many of them of particular interest and should prove helpful to the reader. A good account is given of both cystic and solid tumours of the ovary, and then follows a very instructive chapter on various affections, mainly surgical, of the abdominal organs simulating disease of the reproductive organs. The second part of the work is devoted to medical and operative treatment. In this part some chapters are devoted to general principles, and then all the operations of gynæcology are illustrated by drawings to which are appended short explanatory notes.

The book is a very interesting one, and although, of course, as the author points out in his preface, not a complete text-book of gynæcology, yet will find many readers who should derive much benefit from its study. The coloured illustrations are particularly good, and there is a full index.

MIRACLES AND THE NEW PSYCHOLOGY.

A Study in the Healing Miracles of the New Testament. By E. R. MICKLEM, M.A., B.Litt. Oxon. Oxford University Press. 1922. Pp. 141. 7s. 6d.

IT is probable that the antagonists in a famous controversy about the Gadarene swine would have found less cause for difference if present psychological views had been current in Victorian times. Mr. Micklem, in this scholarly and reverent examination of New Testament records, maintains the thesis succinctly put by Pierre Janet that "La croyance à la possession n'est que la traduction populaire d'une vérité psychologique." He shows the identity of possession with conditions described by Janet, Morton Prince, Flournoy, and other writers of to-day; Janet's description of "Achille," for example, is identical in general form and in detail with accounts of demon possession, and even the cure shares some of the qualities of cure by exorcism, though carried out in accordance with the principles established by Janet in his theory of dissociation. It is matter for regret that the author does not link up these cases, which are unusual and striking, with phenomena such as fugues and gross losses of memory, or show their relation to still commoner hysterical manifestations. Such a unification would leave them less of a mystery to his readers, who may regard them as rarities with little affinity to more ordinary psycho-pathological conditions. The author's excursion into Chinese demonology shows that the phenomena of possession differ little through all countries and ages, but he accepts too readily the claim of Shaman mediums to supernormal knowledge; such knowledge is lacking in the above-named writers.

In studying the miracles of healing Mr. Micklem emphasises suggestion but turns to psycho-analysis for the modern theory of neuroses. The story of the healing of the man sick of the palsy, a healing preceded by the seemingly irrelevant affirmation of forgiveness "when he saw their faith," he simplifies by the explanation—quite in accord with modern views—that "the patient's physical paralysis was the outcome of a mental or spiritual conflict with its accompanying sense of sin or guilt" (p. 90). These psychological views are, of course, not novel, though they have been confined to the small circle of those interested in psychopathology; it is due to a widening interest that the subject has within the last few weeks been a theme of discussion in the columns of THE LANCET, and Mr. Micklem's book comes at an opportune time.

ANÆSTHETICS IN PRACTICE AND THEORY.

By J. BLOMFIELD, O.B.E., M.D., Senior Anæsthetist to St. George's Hospital. London: William Heinemann. 1922. Pp. 424. 25s.

"The aim of the anæsthetist has widened from the mere desire to produce oblivion to pain during operation. His object now is to arrange that the patient shall approach the operation with a quiet mind free from apprehension, that he shall pass through it in complete unconsciousness and in a condition which gives the surgeon the greatest possible facility for his manipulations, and, finally, that he shall recover consciousness free from pain or sickness or other discomfort and in the best possible position to allow of uninterrupted convalescence."

THIS extract from p. 91 of Dr. Blomfield's book sets out the anæsthetist's creed as he understands it, and it is this high ideal of his art that is exemplified throughout one of the best works on the subject we have ever read. It is not only a practical book written by an anæsthetist of large clinical, laboratory, and library experience, but it is also a most carefully compiled digest of all that has been discovered and discussed on the scientific side of the subject up to the present day. It is, moreover, well planned and clearly written.

The first chapter is introductory and historical, showing that the professional status of anæsthetists has advanced with the evolution of the art they practise. The physical and chemical nature of general anæsthetics is fully discussed in subsequent chapters, and those dealing with the physiological action of anæsthetics, the foundation upon which the whole

art of the anæsthetist is built, are quite excellent. Much good advice is to be found in Chapter VIII. upon stage management previous to and during the induction of anæsthesia. The author points out the importance of seeing the patient before the day of operation, of examining him and assuring him of his safety, and stresses the absolute necessity for silence and a calm atmosphere during induction. The patient's power of holding the breath without marked rise of pulse is suggested by the author as a useful indication of cardiac efficiency.

The administration of the various drugs in common use is then considered in detail. In the chapter on the administration of ether no definite lead is given as to the choice between the open and the closed methods for routine use; this absence of bias is characteristic of Dr. Blomfield's broad philosophy. Some anæsthetists regard the open or perhalation method as they do the strap in the underground railway, an uncomfortable refuge for the feeble and the late-comer; others boil with rage and scorn at the sight of a closed inhaler. The ardent blender of ether, morphia, and other soothing and protective drugs with oxygen and certain products of human combustion in nice proportion will find great practical assistance in this volume, while the advocates of open ether will get no less help, but the author deftly avoids judging either school. Gas and oxygen unadulterated has been put by the author in its proper place, "provided that it is given by one who is well versed in its use. . . . . provided also that its use is restricted to suitable subjects." It might be added that the well-versed should be the judges as to the suitability.

Chapter XIV., on anæsthetics less commonly used, is interesting; no mention is made of compression of the carotid arteries, as practised often in the Far East and sometimes by the anæsthetist in the dentist's room in this country. The chapter on Choice of Anæsthetic covers a much wider field than its title suggests. It is an epitome of the mature experience of the author, and everyone called to an unusual case should spare time to consult this chapter before packing his bag. The preliminary use of narcotics is adequately dealt with. In the section dealing with the treatment of undesirable conditions of the patient during anæsthesia three methods of producing artificial respiration have been omitted, the intra-tracheal insufflation of air or oxygen, the rhythmic distension of the lungs by hand pressure on a rubber bag containing air or oxygen adapted to the air-way by face-piece or nose-piece, as practised by the miners, and the mouth-to-mouth inflation of the lungs which is so effective with small infants. These methods are perhaps more efficient than many others; they cause less disturbance to the surgeon and less damage to the patient.

The volume is completed by chapters on accidents and complications, unusual uses of anæsthesia, local and spinal analgesia, and the fatalities of anæsthesia. In this connexion Dr. Blomfield points out that many deaths under and from anæsthetics are preventable. He shows that chloroform is the most dangerous drug, even in the hands of the most skilled, and that the more skilled the administrator the less risk there is to the patient. This chapter, with the first, might be read by the general public, the majority of whom are apt to fear the anæsthetic more than the operation. The story of the wonderful recent development of this branch of medicine so clearly told in these pages would inspire confidence. The family doctor who does not doubt his competence to give anæsthetics occasionally for serious cases because he has done so for the last 20 years, should read this book, which will convince him of the amount of hard work and practice required to become proficient in the art. For the proper performance of operations to-day the skilled use of special anæsthetic methods and apparatus is essential.

Students of the subject of anæsthesia from whatever aspect will be grateful to Dr. Blomfield for this book. Not only the subject-matter, but the paper, print, and binding of the volume are good, and it is unusually well indexed.

ÉTUDES NEUROLOGIQUES.

By GEORGES GUILLAIN, Professeur agrégé à la Faculté de Médecine de Paris, Médecin de l'Hôpital de la Charité. Paris: Masson et Cie. 1922. Pp. 469. Fr.25.

Dr. Georges Guillain's contributions to neurology are already well known to all who follow the progress of that science; in their mind his name is associated with various valuable original papers, especially in regard to the clinico-pathology of the meninges and the cerebro-spinal fluid. He has collected and republished in one volume 56 of these, covering some 15 years of patient labour, and it is a pleasure to renew acquaintance with his lucid descriptions and closely reasoned conclusions. We trust this useful and informative volume will be a forerunner to others, embodying his ripe scholarship and rich clinical experience.

OTO-RHINO-LARYNGOLOGY.

For the Student and Practitioner. Second English edition. By Dr. GEORGES LAURENS. Authorised English translation of the fourth revised French edition. By H. CLAYTON FOX, F.R.C.S. Irel. Bristol: John Wright and Sons. 1922. Pp. 350. 17*s.* 6*d.*

THE second English edition of this book is so nearly identical with the first, which was reviewed in our columns,[1] that little further comment is necessary. It is written as a guide for students and practitioners, and is full of sound points and diagrammatic illustrations, many of which are of great practical value. Much of the treatment is not in accordance with British practice, and this applies particularly to removal of tonsils, for "morcellement" is advocated, and without anæsthesia in children; the guillotine is condemned, and no mention is made of the advisability of complete removal. As would be expected, much attention is devoted to balneotherapy, and the guide at the end will be useful to English medical men who wish to send patients to the French spas. We cannot recommend the book to students and practitioners in this country, unless they know enough of the special subjects dealt with to avoid following methods of treatment which are not recognised as the best routine practice even though they merit trial in particular cases.

ANATOMY OF THE ABDOMEN.

Anatomie medico-chirurgicale de l'abdomen. La région sous-thoracique de l'abdomen. By RAYMOND GRÉGOIRE. Paris: J. B. Baillière et Fils. 1922. Pp. 198. Fr.30.

THERE is a tendency towards stereotyped description in the anatomical books of individual countries, and it is refreshing to come across works that embody the different points of view of other countries. French treatises on anatomical matters are usually inspiring, and the pleasant anticipations with which we opened this book are justified by its contents. This is the second volume which Prof. Grégoire has issued dealing with the anatomy of the abdomen from the practical clinical point of view, and treats of that cavity below what he terms its "thoraco-abdominal" part, the region covered by the lower ribs; presumably, a third part will deal with the pelvis, which receives here no consideration whatever. If the author makes free with time-honoured divisions and classical conceptions, he has the merit of bringing to bear on his subject a great clinical experience of its needs, and a most lucid and comprehensive style in their exposition. We may miss some of the old familiar details dear to the anatomical heart, but we get in exchange many points brought into the light which the anatomist frequently leaves in dim obscurity.

Certainly it is a very sound book that Prof. Grégoire has produced, and, if we find it sometimes difficult to see eye to eye with him, this is only in matters of opinion and has little to do with the facts

[1] THE LANCET, 1920, i., 447.

of his description. The volume begins with a generally excellent account of the abdominal walls. Here we cannot help thinking that the connexions between the small psoas tendon and Poupart's ligament are matters of sufficient clinical interest to merit notice, and we observe that the false description of attachment of the ilio-psoas tendon to the back of the small trochanter is perpetuated. There is a good and complete account of the formation and structure of the umbilicus. The author fails to mention the vitelline vessels among the structures at one time lying in this opening; yet the vitelline artery can undoubtedly form an adherent band of potential surgical importance, and, although we have never had an opportunity of seeing the vein in a similar state, the fact that it runs free through the cavity, and remains in situ long after the artery has normally disappeared, suggests a possibility that it might be the cause of an accident through its persistence. The description of the inguinal canal, not quite on the usual lines, is a very good one.

The second part of the book deals with the contents of this "sub-thoracic" part of the abdomen, that is, with the large and small intestines, the mesenteries, the great omentum, and their vessels, &c. We miss the kidneys and ureters in this connexion; presumably they will come into a later volume, but the picture of relations and regions might be more complete if some account of these were included in this part. The important details of vascular arrangements in the mesentery and along the gut are well given. A good feature is the constant appeal to the author's experience of the living abdominal cavity when dealing with the intestines. The illustrations are not many in number, but those given serve their purpose well. The book is well printed, and is singularly free from misprints or slips.

NURSING.

Text-Book of the Principles and Practice of Nursing. By BERTHA HARMER, B.Sc., Columbia University, R.N. New York: The Macmillan Company. 1922. Pp. 695. 14*s*.

Miss Harmer has given us a lucid exposition of the main principles underlying the practical work of the trained nurse and the nurse in training. The text is presented from the teaching standpoint, and should be useful in training schools both in this country and America. The subject-matter includes, in addition to general nursing information, valuable chapters on the special care required in nursing patients with diseases of the eye, ear, nose, and throat, and the diagrams and illustrations have been well chosen.

BIRTH INJURIES OF THE CHILD.

By HUGO EHRENFEST, M.D., F.A.C.S., Professor of Obstetrics and Gynæcology, St. Louis School of Medicine, &c. London and New York: D. Appleton and Co. 1922. Pp. 221. £1 1*s*.

As Dr. Ehrenfest points out, interest in the causation and prevention of the injuries of the infant during childbirth is growing rapidly, but even at the present day has made but little progress and many practitioners have only a slight knowledge of this important subject. It is probable that 40 per cent. of all autopsies performed upon stillborn children, if properly carried out, would reveal intracranial traumatic lesions of some kind. A most important point brought out by recent observations is that almost every known injury due to childbirth can be demonstrated to occur in cases of easy spontaneous labour, even when the child is expelled apparently with the greatest ease. It is also not unlikely that the modern tendency, at any rate among some schools of obstetricians, to accelerate the great majority of labours by artificial aid will still further increase the number of stillbirths due to parturitional traumatism. The author has done well, therefore, to gather into one volume the large amount of information to be gleaned from the literature on this subject. The result is a book of much value in which all the injuries to which the newborn child is liable have been carefully described. In view of their importance a large amount of space is given to intracranial injuries of all kinds. The causation and the predisposing factors which lead to these injuries are carefully considered, and the fact is brought out that hæmorrhages, whether supra- or infratentorial, are much more common than is generally assumed. Attention is also drawn to the fact that such hæmorrhages are likely to be overlooked unless the examination of the skull and brain is carried out in a special manner. The symptoms of these hæmorrhages and their differential diagnosis are fully discussed. In describing the interesting condition of hæmatoma of the sterno-mastoid muscle the author agrees with the suggestion that such tearing only affects a congenitally malformed or degenerate muscle, that comparatively slight traction only is necessary to lacerate such a muscle, and that in some cases the trauma may be inflicted merely by the pressure of the corresponding shoulder.

The practitioner or obstetrician who is called upon to deal with an uncommon case of birth injury will find this work of great value, and the fact that a bibliography is given with each chapter increases its usefulness.

FIRST LESSONS IN PRACTICAL BIOLOGY.

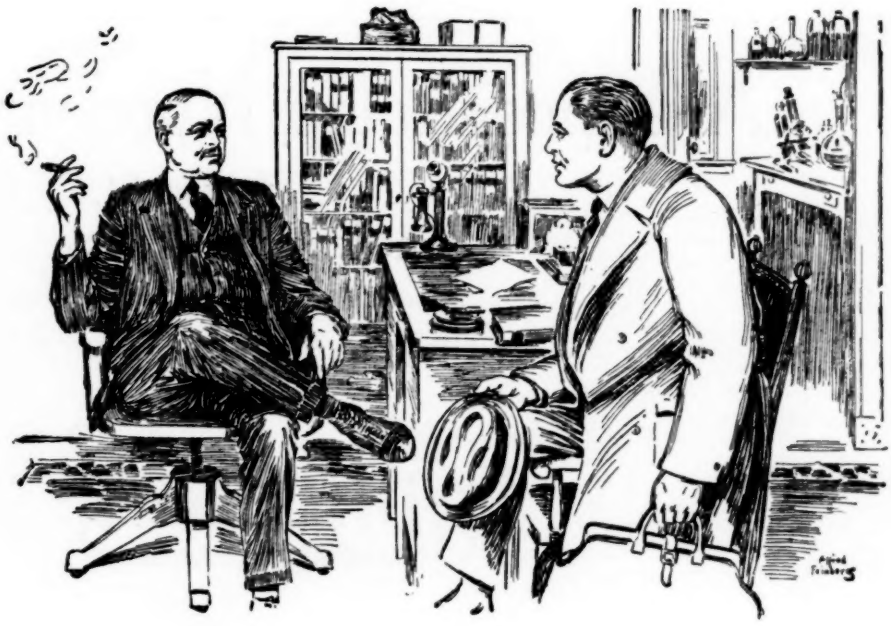
By E. W. SHANN, B.Sc., F.Z.S. London: G. Bell and Sons. 1922. Pp. 225. 5*s*.

THE author of this small volume is biology master at Oundle School and has naturally attempted to satisfy the needs of beginners in the instructions, both practical and theoretical, embodied in his volume. Mr. Shann has written his guide for boys in about the middle of the school. For the upper boys there is, he thinks, a sufficiency of text-books, while those of the lower forms are better taught verbally at informal lecture demonstrations. In any case we have here quite a successful attempt to select from the immensity of material at the author's command a sufficient quantity of well-arranged matter to provide the reader with an introduction to biological study. The 20 chapters are fairly divided between plants and animals, a few only being reserved for the discussion of general matters, theoretical and practical, such as the microscope and elementary conceptions of variation and heredity. The last-named chapter is not at all difficult and could be understood by quite junior boys, to whom graphs are nowadays familiar. Many of the numerous excellent illustrations are based upon drawings made by boys actually in the school at the time the work was being prepared.

New Inventions.

A NEW MICROSCOPE LAMP.

Messrs. Ogilvy and Co., of 18, Bloomsbury-square, have produced a new electric microscope lamp, costing twelve guineas, for research workers, which possesses several new features. The lamp is well made and is firmly supported on an upright pillar mounted on a heavy tripod base which gives excellent stability, the electric bulb is of the ordinary half-watt type made of specially prepared opal glass, and it is enclosed in a hood of generous proportions which is practically light proof. On the front and inside of the hood, closely applied to the bulb, is a permanently fixed iris diaphragm which regulates the size of the source of light. The lamp is fitted with a small optical bench, which carries a condensing system, iris diaphragm, and light filter holder. The condenser is fitted with centring screws, and is mounted on a hinge so that it can be swung out of the optical system when not required. The instrument is beautifully made and fulfils the purposes claimed for it, though it is doubtful whether for "critical" illumination the extra complications are desirable, for diminishing the size of the source of light may actually cut down the numerical aperture in use.



DR. JUNIOR: "*Doctor, there is just one other interesting point I had overlooked, and one you may be able to explain.*"

DR. SENIOR: "*Well, what is it?*"

DR. JUNIOR: "*The old-fashioned poultices—bread-and-milk, linseed meal, and so on—always grow so cold in a few hours as to give one the creeps, almost——*"

DR. SENIOR: "*Exactly. Go on——*"

DR. JUNIOR: "*Antiphlogistine, I have observed, retains its heat for as long as twenty-four hours. How do you account for that scientifically?*"

DR. SENIOR: "*In this way, Doctor. Antiphlogistine, a scientific product, is the result of a working knowledge of Chemistry as well as Physics. The heat-retaining property is due to the chemical reaction which goes on during osmosis between c. p. glycerine of Antiphlogistine and the waters of the tissues. It is constant until full saturation has been reached—which averages about twenty-four hours.*"

DR. JUNIOR: "*I see where you are right in maintaining that Antiphlogistine is not a mere 'poultice.' I had my doubts about it remaining warm for such a long time.*"

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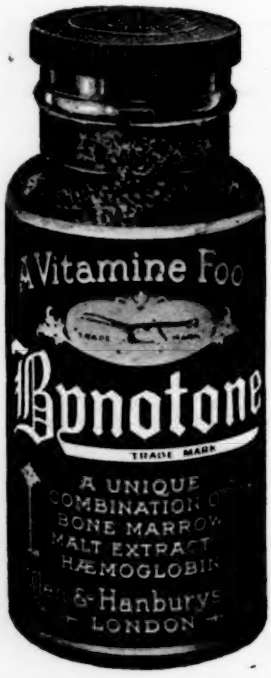

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See also p. 27

THE LANCET.

LONDON: SATURDAY, NOVEMBER 18, 1922.

The Dual Problem of Tuberculosis.

IT is a common passion of the orderly human mind to propose a new terminology when confusion between things which are distinguishable and which ought to be distinguished persists too long. The deceitful attraction of definitive names leads so often to the failure of these praiseworthy attempts to clarify our muddled thinking that revisions of nomenclature have fallen into some disrepute as a method of progress. But one is almost inclined to do something of the kind in the matter of bovine and human tuberculosis in the hope that the daily press will cease to print headlines about "milk and spread of consumption," and that the help of the public, so vital to the success of any hygienic reform, may be secured on an informed as well as an enthusiastic foundation. The recent National Milk Conference at the Guildhall bore witness to the volume and importance of public interest in measures for safeguarding the milk-supply.

Among much that is obscure, it is now clear that human and bovine tuberculosis are epidemiologically two distinct diseases. They are caused by different parasites which, when they reach man, come by different routes. The human bacillus is of no importance whatever in the causation of tuberculosis in cattle. The bovine bacillus may equally be neglected as a cause of consumption in man, though in the tuberculous infection of glands, bones, or joints in childhood it is responsible for a proportion which cannot be neglected. The respective responsibilities of the two organisms vary widely in different places, the chief conditioning factors being presumably the prevalence of tuberculosis in the cows and the freedom with which unheated milk is consumed. Bovine infection is, for example, almost or quite unknown in India and China, trivial in Italy, and probably reaches its maximum in England or rather, as far as the meagre information goes, in Scotland. From the classical researches of the Tuberculosis Commission, continued since by the exhaustive labours of Dr. STANLEY GRIFFITH, Dr. L. COBBETT calculated that the bovine bacillus causes about 6 per cent. of deaths from tuberculosis of all kinds in England and Wales. A disease which causes 3000 preventable deaths per annum in this country cannot, even with our present standards of value, be called negligible, and the reflexion that it adds many times that number to our maimed will, we hope, confirm those who are showing signs of weakening in the campaign to suppress tuberculosis in cattle. Infected cattle are poor things from their own point of view; they are bad milkers and fatten with difficulty. That they should be eradicated by wholesale slaughter is, of course, quite impracticable. But Mr. W. BUCKLEY and others have now shown that their elimination is by no means an impossible proposition, and a gradual extension of his methods will no doubt ultimately achieve its object. But if human and bovine tuberculosis are in their causes and incidence distinct diseases, they have a common feature of near relationship in their immunological connexions. The absolute specificity of acquired resistance to parasites is now recognised to be superimposed on a resistance which is common to many of them. With organisms so closely akin as the two tubercle bacilli the overlapping is considerable. Cattle may be protected against bovine bacilli by vaccination with the human kind, though the technique by which complete immunity may be obtained by this method has not yet been worked out. And there is every reason to believe that the reverse holds good in man and that appropriate doses of bovine bacilli in youth sometimes give the body the training and practice which enable it to resist human bacilli later on in life. The bovine bacillus, like other evil things, is not necessarily always and wholly bad.

Our conceptions of the process of bacterial infection have till recently taken too little notice of quantity and frequency, and it seems clear that they require revision on these points nowhere more than in tuberculosis. The human tubercle bacillus is universally present; no further proof of this is wanted than the fact that men who have spent ten years or so drilling in rock rich in silica so frequently die with pulmonary infection. And by the time they are adolescent, three-quarters of the population have received the bacillus into their bodies and have responded to its presence so as to give positive test reactions. A few cases of ordinary phthisis may be due to massive single infections, but the view, ably urged by CALMETTE, that the manifestation of obvious illness is the cumulative effect of repeated doses seems difficult to reject. Small doses arouse a reaction which is protective, but if they are repeated too often, and especially if they are too large, the reaction is so extensive and prompt that it helps rather than hinders the invasion of the bacilli; the subject is sensitised and sensitive and it is because of this sensitisation that he develops frank disease. The proposition which, with the current abundance of tubercle bacilli in the world, is reasonably practical is not to guard man completely from the bacilli but to prevent him getting too many of them too often—in other words, to keep him away from sources of massive and continuous infection, i.e., from people who are continually spitting up innumerable organisms in his immediate neighbourhood. Quantity and frequency of infection are functions of propinquity, and overcrowding has the same influence on tuberculosis as it has on influenza or cerebro-spinal fever. Phthisis in India might be no less appalling if bovine infection were as common in India as it is in this country, but it is at least an arguable proposition that a milk-supply completely free from tubercle bacilli might not be an unmixed blessing if at the same time the opportunities of free and frequent infection from phthisical cases were allowed to continue unabated. Though, then, human and bovine tuberculosis are distinct diseases, the problem of human tuberculosis must embrace them both and the reform of our cow-sheds and our slums must go along together.

Testicular Grafting.

Dr. S. VORONOFF, who is a director of the Laboratory of Experimental Surgery at the Collège de France, has been investigating the subject of testicular grafts since 1917. In a monograph he summarises the results of some 120 testicular grafts performed on animals and even carried out on the human being. The first experiments were made by grafting the testicle of a lamb upon a female sheep. As a result of this a definite alteration in growth occurred, the sheep remaining smaller than control animals and showing premature ossification of the cartilages of the limbs. In another sheep, previously deprived of ovaries and grafted in a

similar manner, the horns acquired a greater degree of development than normally occurs in the female and approximated to those of the male. The second series of experiments were undertaken in castrated males and were sufficient to demonstrate that testicular grafts could prevent the appearance of the alterations in growth and character that are generally associated with removal of the testicles. In the third series, Dr. VORONOFF investigated the effect of grafts in cases of senility. Two old goats, showing all the stigmata of their age, were selected for the experiment, the grafts being taken from young males and inserted into the tunica vaginalis according to the technique described by the author. The results appear to have been dramatic, the animals losing their miserable appearance, putting on flesh, renewing their coats, and behaving as young and vigorous animals. The removal of the grafts from one of the animals resulted in a recrudescence of senility, which was again cured by a second grafting operation, thus demonstrating the possibility of obtaining successive rejuvenations. Encouraged by his animal experiments, VORONOFF carried out his first graft on a human being in 1920. Owing to the enormous difficulty of obtaining human material, he was forced to select grafts from chimpanzees, basing his use of the higher apes on the observations of FERD. GRUENBAUM and others, that the blood of man is of the same composition as that of monkeys, although it differs completely from that of the other animals. Seven cases in all are reported, in some instances the grafts being undertaken in order to replace loss resulting from bilateral orchectomy, and in others for senility. The results of grafting in the former class of case were on the whole less gratifying than those obtained in the latter. This is due to the fact that in a patient whose testicles have been removed, say, for bilateral tuberculous disease, the scrotal tissues are likely to harbour organisms and to provide a poor nidus for a testicular graft. Undoubtedly the most successful case was that of an Englishman of 74, who stated that he had recovered 20 years of his lost health as the result of testicular grafts.

Dr. VORONOFF'S work will certainly appeal to all interested in the endocrine glands, and the changes occurring in those glands in old age. The possibility that certain cases of premature senility may be due to changes occurring in the testis, and especially to changes in the internal secretion of the testis, has been suggested by a great many workers. Prof. EUGEN STEINACH has emphasised the important bearing that the internal secretion of the testis has on old age problems, and, like VORONOFF, has attempted the rejuvenation of old animals by increasing the production of internal secretion. Although the method by which he has attempted to achieve this differs from that of VORONOFF, the rationale of the treatment remains the same. Both have assumed that senility in the majority of cases is associated with the failure of the internal secretion, and can be remedied by making good the defect. Neither would appear to have exercised any discrimination in selecting their cases for rejuvenation. In other words, subjects have been chosen merely because they were old, and not because they exhibited signs of deficient testicular secretion. Both workers have claimed success and both have interpreted their successes in terms of a different pathology. STEINACH has claimed that by tying a vas and putting out of action the spermatogenic function of the testis, he has produced compensatory hypertrophy of the "interstitial" portion of that gland. VORONOFF, on the other hand, following the teaching of ED. RETTERER, believes that the internal secretion of the testis is furnished, not by the interstitial cells, but by the seminiferous tubules themselves, and claims that the only method of increasing the production of internal secretion is to apply to the individual vigorous young grafts. Whilst admitting that old age cannot be attributed to a single cause, he claims that our strength and energy, both physical and mental, are bound up in the state of the sexual glands, and that where no other reason for decay is apparent, it is logical to supplement failing powers of the sexual glands by means of grafts.

Although VORONOFF'S investigations are exceedingly suggestive and of the greatest interest, there are omissions in his book that the cautious and serious researcher will most certainly regret. Whilst the layman will probably acclaim his results as fully proved, the more sceptical scientist will demand further details before he can accept all that the author claims. The accounts of the cases of rejuvenation are lacking in precision. In the modern laboratory are numerous instruments of precision that might well have been used in assessing the success of testicular grafts in human beings, and a few observations by means of ergographs, fatigue experiments, blood-pressure records, and basal metabolism investigations would have been of greater value to the scientist than photographs of old gentlemen fencing and carrying bags upstairs. However, although the absence of these details is to be deplored "Greffes Testiculaires" [1] remains a work of far-reaching interest.

Rats.

APPARENTLY we cannot avoid being an emporium of the world's rats. Geographical position confers this distinction upon us, since we are the commercial heart of the world with the largest storehouses of food. Mr. E. G. READ, technical adviser on rat repression to the Ministry of Agriculture, made this point perfectly clear to the important municipal conference arranged by Dr. C. W. HUTT at the Holborn Town Hall during the recent official Rat Week. We cannot avoid the influx of rats. Hartlepool, for instance, imports foodstuffs from the Far East. Rats accompany the food and come ashore; they take no return tickets inasmuch as the ships leaving Hartlepool are laden with unattractive metallic ores. Arriving in the port, they establish lines of communication through the sewers and infest the warehouses throughout the sanitary area. In the present state of public opinion Mr. READ frankly regards it as impossible to exterminate rats in England. The colossal aggregate of material damage done by rodents has been proved over and over again and has left the country unmoved except for the opportunity of collective action made possible by the Rats and Mice Destruction Act. The gibe is only too true that it is only in moments of dire destruction or sickness that serious attempts are made to kill either rats or mice. A terrier in Leadenhall market recently gained great renown by worrying to death 200 rats in 14 days, but the public hardly tried to realise what must be the constant ravages of rats in the metropolis when an untrained dog can find that number of vermin in a small area within a few days. Sanitary reformers can scarcely hope to carry the public with them in a great crusade against rats until it is definitely brought home by scientific proof and the actual results of research that risks are run by harbouring these pests in human habitations.

[1] Greffes Testiculaires. By Dr. S. Voronoff. Paris: Librairie Octave Doin. 1922. Pp. 83. With 19 illustrations.

Moreover, the public must be satisfied that the remedy is not more dangerous than the disorder. Phosphorus, the lethal agent hitherto in use all over the world, involves more than a little risk of human life, but phosphorus can be replaced by barium or squill. Rat viruses are not good practice. Sir FREDERICK ANDREWES indicated at the Holborn meeting that the scientific evidence in their favour is not sufficient to justify their employment. The late Prof. F. A. BAINBRIDGE experimented with a number of the rat viruses on the market under conditions closely simulating those actually found. He fenced off with wire netting an area of cellars filled with broken drain-pipes, in which the rats lived and bred. With no virus was he able to kill off more than 30 to 60 per cent. of the rats, many of the survivors showing disquieting evidence of having acquired immunity against the virus under test. In view of the possibilities of food poisoning the use of such organisms as the Gaertner and Aertrycke bacilli is not justified when simple chemical poisons such as barium and squill are available. Sir FREDERICK ANDREWES recalled in this connexion a serious outbreak of food poisoning which occurred in Holborn a score of years ago when a large number of men working in a drapery stores were taken ill on a certain day with high fever and gastro-enteritis, although fortunately no fatality occurred. The advantages of the newer rat poisons were put fairly and moderately at the Holborn meeting by Mr. O. L. CLAREMONT, late rat repression research chemist to the Ministry of Agriculture. Barium carbonate and red squill are less dangerous than other poisons, but naturally require a larger dosage. Although it is not proven that these substances would never kill other animals, even barium carbonate, properly used, is a comparatively safe preparation of which 2 to 5 gr. will kill an average-sized rat. Red squill in liquid form added to bread and milk is an effective preparation, simple in use. Rats, as a rule, become shy of any poison after a time, but squill appears never to excite suspicion.

The combined wisdom of three other medical officers of health—City of Westminster, Borough of Southwark, Port of London—which was at the disposal of this meeting, threw light on the nature of the concerted measures of rat destruction which are desirable. Dr. G. MILLSOM went so far as to express complete scepticism in regard to poisoning. Rats, he said, fatten upon barium and squill, but can be trapped with varnish. The problem of ridding the sewers of infestation was regarded by all as of first-rate importance. Fortunately this year more effort is being made both by the borough councils and by the London County Council towards destroying rats in their own sewers. Once clear the sewers and dwelling houses would become practically free, were it not for the invasion of the so-called climbing rat which scales buildings and roofs and is popularly believed to descend chimneys. Man himself Dr. W. M. WILLOUGHBY regards as a great inimical factor to the increase of rats; when a large proportion of the male population was drafted abroad, rats had a long innings which only came to an end with the return home of the troops. The Mayor of Holborn, in summing up the results of the Conference, laid his finger on one great essential of any rat campaign. Rats have litters something like six times a year, and it is futile to have an annual or biennial field-day and then suspend operations between whiles. It is necessary for every sanitary authority to have some officer whose business it is to see that the campaign is constantly and relentlessly carried through.

The Treatment of Diabetes by Insulin.

WE have received from the Medical Research Council an important statement upon the new treatment of diabetes by insulin, to which prominent attention has been called in these columns recently. From this statement we learn that the authorities of the University of Toronto, in whose laboratories the work has been and is being done, have taken special measures, in the interests of the public, to protect and control the manufacture and use of the substance in the United States and in Canada; further, that they have offered their rights as a free gift to the Medical Research Council in order that the same protecting and controlling powers may be exercised in this country. The Medical Research Council has accepted the trust, its representatives having examined personally and closely the work proceeding at Toronto.

The statement of the Medical Research Council sets out the considerations by which its policy will be guided, while it is mentioned at the outset that none of the new substance is yet available in this country. It is humane and wise to lay stress on this point—humane because the raising of false hopes will be prevented, and wise because when a great deal of difficult administrative and scientific work remains to be done those responsible require as much freedom as possible from all approaches which may lead to waste of time or to needless work. It is admitted by the Medical Research Council that the new treatment opens a real prospect of relief to many sufferers, a view which coincides with one which we have been able to express in a tentative way in these columns when describing the methods adopted in Prof. J. J. R. MCLEOD'S laboratory of preparing pancreatic extracts. But experiments in a laboratory cannot be followed immediately by successful manufacture on a large scale in a factory, and at the present moment insulin is only being made in small quantities in the laboratory of the University of Toronto and at one or two other laboratories, with the result that hardly sufficient even for the needs of the patients undergoing experimental treatment is being produced.

The Medical Research Council, in these circumstances, having accepted the important trust laid upon it, is using all means to safeguard and accelerate the proper production of the remedy. But before any attempt to keep pace with the demand is possible a general plan of campaign must be laid down. It is this campaign upon which the attention of the Council is now fixed, and upon whose organisation great liberality of judgment is being exercised. The Council intends to promote, in the light of what is now proved, "whatever enterprise or organisation is best fitted for securing the earliest production of the insulin extract under proper conditions of safety and control." In this way the necessary scientific trials of the treatment can be most readily obtained.

THE LATE DR. J. M. RATTRAY.—The death was recently announced of Dr. John Moysey Rattray, who graduated in medicine and surgery at the University of Aberdeen in 1882, proceeding to the M.D. in 1891. After holding a house appointment at the Royal Infirmary, Aberdeen, he settled in the West of England, where he took an active part in the organisation of the British Medical Association, becoming President of the Bath and Bristol Division.

Annotations.

"Ne quid nimis."

EXPERIMENTAL SEARCH FOR EVIDENCE.

A PAPER by Dr. R. E. House, of Texas,[1] throws light upon mysterious reports of a "truth serum" which was apparently to take the place of the oath in American legal procedure. The serum is our old friend, scopolamine, and Dr. House was led by observations on twilight sleep to make use of its effect, in combination with chloroform, in inhibiting control so that the subject truthfully answered questions and lost the power of telling lies. He claims to have aided justice in some cases, and says "I could make anyone tell the truth on any question," but scrutiny reveals a one-sided experience, for the truth was always in favour of the person questioned. Yet, reading between the lines, we may presume that under the influence of the drug there was an increased acuity of memory such as occurs in hypnoidal or trance states, and the information obtained may well have been of value. Following the analogy, we may note that even under hypnosis information that the subject is determined to withhold will be withheld, and Dr. House produces no evidence that this control is lessened in the physio-psychological state induced by scopolamine. Moreover, though the recall of forgotten experiences under hypnosis is a commonplace, yet sometimes, though rarely, the subject produces phantasies showing great verisimilitude, only to repudiate them when waking. Apart from possible legal value, such special methods may aid in the elucidation of the truth. We understand that investigations under some kind of hypnosis occasionally showed, during the war, that punishable actions were carried out when the agent was in a pathological mental state, although it is doubtful whether a man ever confessed under hypnosis to actions which he would not have confessed, to the same operator, when in a state of full consciousness. On the other hand, Jung has described his success in detecting a thief among several suspects by the word-association test, which, though appearing to be little more than a drawing-room game, may be a really searching inquisition. This test has the advantage of being harmless to the innocent and can be used without indicating what the aim of it may be, especially in an institution where, as in Jung's case, suspicion falls upon several people, but its interpretation needs care and experience. In an attractive unfinished drama now on the London stage, Sir James Barrie sketches the behaviour towards an unexpected accusation of murder of a circle of dinner guests, one of whom and one only is guilty. In England the prisoner or suspect is not compelled to incriminate himself. Legal custom does not tolerate the browbeating procedure, known as the "third degree," to break the will of a suspect, nor do we follow the French method of confronting him with a reconstruction of the crime. The only apparent scope for experimentation along the lines suggested by Dr. House's paper would be in the preparation of a prisoner's defence, and then interesting legal questions might be expected to arise.

CRANIAL INJURIES.

THE treatment of severe cranial injury has, up to the present time, remained in an unsatisfactory state. Where there is a clear indication for operation, such as a depressed fracture or a subdural hæmorrhage, giving rise to localising symptoms, then operative interference has often been successfully carried out. But in cases of linear fracture or of severe concussion the treatment has usually been ultra-conservative, the patient being left to the care of nature, almost unaided except by the provision of darkness and quiet surroundings; even this simple treatment is difficult to obtain in the ward of a general hospital to which so many patients with these injuries are perforce consigned. Subtemporal decompressions have often been tried, but the results have been bad, and it is recognised that this operation is inadvisable. The prognosis of severe cranial injuries has therefore remained extremely grave. The patient remains for a longer or shorter time in a state of acute cerebral irritation which is followed by stupor. If he survive these stages, it is often found, after a prolonged convalescence, that he has suffered permanent impairment of his mentality or intellect or of both.

The importance of a paper published by Dr. Harry Jackson, of Chicago,[1] can thus be readily appreciated, for here a systematic line of treatment, which has given good results, is advocated. This writer bases his argument on present-day knowledge of the cerebro-spinal circulatory system. That severe cranial injury is often accompanied by laceration of the brain, and always followed by traumatic œdema of the brain, is common knowledge; but the way in which this interferes with the normal balance in the vascular and cerebro-spinal systems is less well understood. The resulting increase in intracranial pressure is not relieved by a decompression operation because the opening that is made is at once blocked by the bulging of the brain against its edges, so that the relief of tension is slight and transitory. Dr. Jackson has, however, successfully treated this state of affairs by systematic drainage of the cerebro-spinal system through a lumbar puncture needle. There is nothing new in the performance of a lumbar puncture for increased intracranial pressure, but Dr. Jackson has applied the needle with the maximum of science by attaching to it a mercurial manometer, so that a definite relief of increased pressure is the object in view. This is repeated at frequent intervals as often as is found necessary while the pressure is seriously raised, so much fluid being withdrawn on each occasion as will produce the result desired. As Dr. Jackson points out, the remote effects of cranial injury are probably to be attributed to the prolonged anæmia to which the brain cells are subjected if the pressure be not relieved. The treatment should therefore be applied within a few hours of injury, and the pressure should not be allowed to increase to the point of producing obvious signs. The immediate results have been most encouraging, probably owing to the relief of pressure on the medulla which is obtained. A large number of patients have been treated, about 1000 lumbar punctures having been performed without mishap. Fluid to the amount of 10–20 c.cm. is withdrawn every 12 to 24 hours, according to the amount of increase in pressure registered on the first occasion. Severe cases have been tapped on eight successive days, and subsequently at intervals of three to four days, the pressure being reduced by 4 to 6 mm. Hg each time. It is claimed that the mortality in cases of cranial injury has been reduced by this means from 50 to 25 per cent. The later results, which will be reported more fully in another communication from the same writer, have also been gratifying, the symptoms known as "traumatic neurosis" usually being absent.

PHYSIOLOGICAL OLD AGE IN MAN.

Dr. Arthur MacDonald, of Washington, D.C., in the *New York Medical Times* for September, 1922, deliberately regards old age from the physiological standpoint, whilst admitting that physiological changes in the old appear much greater than can be explained by waste or anatomical structure. He divides what he terms senile regression into three phases: first, presenility; second, old age proper; and, third, decrepitude, and declares the view that women do not show signs of the first stage at the age of 40 so often as men. Here Major R. J. C. Thompson and Major R. E. Todd,[2] writing recently in THE LANCET, have supplied pertinent information. They have been

[1] The Use of Scopolamine in Criminology. Reprint from Texas State Journal of Medicine, September, 1922.

[1] Jour. Amer. Med. Assoc., Sept. 22nd, 1922, lxxix., 1394.
[2] THE LANCET, April 29th, 1922, p. 874.

for over two years in medical charge of the Royal Hospital, Chelsea, with a population of 500 veterans averaging 73·3 years of age with 22 per cent. aged 80 years and over. These observers find old age not a mere physical deterioration, but a state to be expressed by two equations: (1) Physical deterioration = senescence; (2) physical deterioration + lowered mentality = senility, and their general findings are in accord with those of Dr. MacDonald as far as a male population is concerned. But with respect to diet Dr. MacDonald and the English observers are not in agreement, for whereas he finds that the loss of teeth and necessary limitations in diet lessen appetite, they report that the Chelsea veterans, as a rule, eat enormously; lack of teeth does not spell indigestion at the Royal Hospital. At Chelsea certain forms of heart disease are the most frequent causes of death. Dr. MacDonald draws attention to the pernicious circle occurring in old age after the limit of compensatory heart hypertrophy is reached, when slower circulation results in less nutrition to the heart itself. His practical message to those who sign death certificates is that old age is not a disease and rarely a cause of death, whatever statistics may indicate: death is, he holds, often due to disease which remains unrecognised by the medical man, who affixes the convenient label of old age.

UNORTHODOX VIEWS ON INFLUENZA.

"At the first feeling of illness, or rise of temperature, it is the private and public duty of the patient to go to bed at once, to remain at rest and in warmth."

THIS quotation, taken from the Ministry of Health's "Report on the Pandemic of Influenza" would seem to most readers to contain safe and innocuous, if not very helpful, advice. But in the opinion of Dr. Andrew Garvie of Halifax this advice is not wholly wise, and in the *Glasgow Medical Journal* for October he has supported his criticism of it by a logically developed argument and by a record of observations both new and stimulating. The path he has followed has not proved smooth, and as he says, "so long as we as practitioners are handicapped by advice issued through the press, I would not urge anyone, unless that one is prepared to put his professional reputation to a tremendous strain (the words are chosen from grim experience), to follow the lines of treatment recorded in this article." Dr. Garvie divides influenza into stages. In the primary stage, infection is external to the tissues, being confined to the respiratory and possibly alimentary tracts, and there is little or no toxic absorption. The secondary stage is characterised by toxæmia, accompanied, it may be, by invasion of the lungs and other structures. He noticed that when the symptoms in the primary stage were well marked, the disease invariably ran a favourable course, and that patients with the so-called gastric type of influenza never developed the secondary stage. He also noticed that the environment or treatment which appeared to give relief to the symptoms of the primary stage favoured the production of the secondary stage, and that this stage—i.e., the complications of influenza—developed in those cases in which the early symptoms were most slight. Further, the onset of the secondary stage was marked by the disappearance of the symptoms of the primary stage such as free secretion from the nostrils, sneezing, nausea, vomiting, and pain in the limbs. Some very interesting observations were made with regard to the course of the disease under different conditions. Thus the death-rate among housewives—i.e., home-workers—was less than 1 per cent., while among industrial workers visited in their homes it was nearly 9 per cent. The death-rate among sporadic cases was negligible, and, as a rule, the first case in any one house was milder than later cases. None of the patients who were first seen at the surgery, no matter how serious the symptoms, developed the secondary stage, and none died. As the presence or the absence of the free flow of nasal secretion appeared to have a very intimate bearing on the subsequent course of the disease, Dr. Garvie did his best to promote this flow and in general to produce in every patient the maximum of primary symptoms. With this object he endeavoured to obtain free currents of air in the sick-room, bodily warmth being provided by adequate clothing and not by artificial heating of the room. If the patient could not be assured of a well-ventilated bedroom to himself—and this was seldom feasible—and if he felt capable of a little outdoor exercise, he was not encouraged to stay in bed or to remain much indoors. But the way of the reformer is as hard as that of the transgressor, and Dr. Garvie has come to the conclusion that "it is much easier to get a patient's consent to have his abdomen opened than his windows." Between Dec. 26th and Feb. 1st he saw 223 new cases of influenza, 138 of which were seen in the home and 85 at the surgery. No patient who came under his care in the primary stage subsequently passed into the secondary stage. One patient first seen in the moribund stage of heliotrope cyanosis recovered after being exposed to a blizzard and given a guaiacol pack. Since June, 1918, Dr. Garvie has attended between 1500 and 2000 cases of influenza, and though most of his patients still reside in his district, and records have been kept, he knows of only one case of chronic illness which apparently developed from an attack of epidemic influenza. Hence his scepticism as to those two time-honoured phrases—"I had an attack of influenza six months ago and have never been well since," and "The patient's illness commenced with an attack of influenza."

SMELL AND TASTE IN THE VERTEBRATES.

BIOLOGY, which not long ago was purely descriptive and speculative, has begun to adopt the methods of exact science by means of experiments both qualitative and quantitative, and part of the outcome of this change is the production of a series of "Monographs on Experimental Biology." One[1] of these deals with the senses of smell and taste, which, having regard to their manifold significance as protective organs as well as organs initiating that chain of events which culminates in successful nutrition, are essential to our organic well-being, though their activities are less associated with our mental states than are those of the ear and eye. The sense organs of the lower animals were primarily regarded as providing the brain or corresponding structure of the given animal with that body of sensation which was supposed to represent all the significant changes in the effective environment. This view underwent an important limitation with the development of our knowledge of reflex actions unassociated with consciousness. Even so-called sense organs or receptors are not always associated with sensation and other central nervous states. The presence of eye spots, olfactory pits, statocysts, and other special receptors is no indication that the animals possessing them are endowed with corresponding sensations. The chemical receptors, the organs of smell and taste, are functionally and genetically interrelated and are considered by Prof. Parker from this point of view. In nasal stimulation it is important to bear in mind that true irritants act on the trigeminal terminals and true odours affect the olfactory endings: the former induce vigorous protective reflexes, respiratory and the like—e.g., sneezing—while true odours are in nature much milder and seldom call forth strong responses. Pavlov has shown the great importance of true odours in exciting, and to some extent controlling, the whole chain of digestive secretions, a process just as significantly reflex as sneezing, though not so easily observed. Both classes of stimuli are followed by abundant and important reflexes. The olfactory organs in man, though concerned with food that is being masticated, are much more concerned with the odours of environment, and are thus to be classified as distance-receptors. Odours have much

[1] Smell, Taste, and Allied Senses in the Vertebrates. By G. H. Parker, Sc.D., Professor of Zoology, Harvard University. London and Philadelphia: J. B. Lippincott Company. 1922. Pp. 192. 10*s.* 6*d.*

to do with sexual activities, but the prime service of olfaction is the quest of food—from fishes to mammals—and is thus indirectly a highly significant sense for the direction of locomotion. The high development of this sense in our ancestry, though it has left little keenness of olfaction in man, has left a profound impression on the organisation of our central nervous apparatus. Olfaction is essentially a chemical process, and the adequate stimulus for both water-inhabiting and air-inhabiting vertebrates is a solution in contact with the olfactory hairs and perhaps formed in part in these bodies. The vomero-nasal organ is regarded by Prof. Parker as a subsidiary olfactory organ.

The comparison and relations of the taste sense to the common chemical sense—i.e., to the receptors for chemical irritants—forms a fascinating study and leads up to a consideration of the anatomy and physiology of the gustatory organs in lower vertebrates and man. In young individuals, babies and human embryos, taste-buds are more widely distributed than they are in the adult. They degenerate after section of the nerve supplying them, and new buds reappear coincident with the regeneration and arrival of the nerve, so that the bud is dependent on the nerve. It is suggested that when a twig of a nerve reaches a given spot of the epidermis it gives out a substance that excites the epithelial cells of that spot to form a bud, much as the embryonic cup of the vertebrate excites in the super-imposed ectoderm the formation of a lens. The four categories of taste—sour, saline, bitter, and sweet—give remarkable evidence of having separate receptors. On the whole, Prof. Parker thinks, it would seem more consistent to speak of the sour sense, the saline, the sweet, and the bitter sense than of the sense of taste. What is smelled is generally not tasted and what is tasted is not smelled. Olfaction deals effectively with very minute amounts of substance and gustation only with much greater amounts. Olfaction initiates the feeding reflexes both muscular and secretory. While food is found and the digestive secretions are started through smell, these secretions are intensified ordinarily through taste—which reinforces and completes the feeding reflexes—though the two senses are perfectly distinct. Taste is not the name for a single sense but for a group of senses, and it is likely that smell is of the same nature. Prof. Parker gives a short but interesting account of the genetic relations of chemo-receptors, and these are discussed in relation to mechanico-receptors and radio-receptors. It is obvious from his singularly attractive contribution to our knowledge of smell and taste that we have as yet little information on the chemical senses in the lower animals. Indeed, it may be said that the comparative physiology of taste in vertebrates is almost an untouched field which would well repay cultivation.

THE CARDIAC COMPLICATIONS OF GONORRHŒA.

Dr. W. S. Thayer,[1] of Baltimore, reviews the cardiac complications of gonorrhœa which have occurred at the Johns Hopkins Hospital since its opening in 1899, during which time 22 cases of gonorrhœal endocarditis were observed. The comparative frequency of the gonococcal origin of endocarditis is shown by the fact that out of 176 cases of acute endocarditis in which the bacteriological nature of the process was determined at the Johns Hopkins Hospital by blood cultures or at the necropsy 20 or 11·3 per cent. were due to the gonococcus. In four of these cases there were terminal infections, in two with streptococci, in one with streptococcus and staphylococcus, and in one with pneumococcus, but in all the gonococcus was the primary cause. The ages of the patients ranged from 9 to 42; 16 were males and 6 females. Eleven were white and 11 negroes, a larger proportion of negroes than was obtained in other forms of endocarditis except pneumococcus infection. The relation of the onset of the symptoms to the stage of the initial infection could be determined in only a few cases, in which the interval varied from a few days to a month. In several instances all traces of urethritis had disappeared. As regards the presence of other complications, arthritis occurred in only 41·1 per cent. of Dr. Thayer's cases and in 68·5 per cent. of 54 cases collected from other sources. The symptoms were uniformly those of a grave septicæmia. The onset was either gradual, with headache, lassitude, pains in the loins, or more sudden and initiated with a sharp chill. Examination of the blood showed a rapidly progressive anæmia and well-marked leucocytosis. Embolism was common, being met with in two-thirds of the cases. Cutaneous hæmorrhages in the form of petechiæ on the limbs, trunk, or mucous membranes were frequent. Acute or subacute nephritis was present in most of the cases. The duration of the endocarditis ranged from three weeks to eight months, averaging 9·7 weeks. The aortic valves were most frequently affected (13 cases), but as in all forms of acute ulcerative endocarditis the right side of the heart was more frequently involved than in chronic rheumatic valvular disease, the pulmonary valve being implicated in five cases and the tricuspid in four cases. The mitral valve was also affected in four cases. It was found that the gonococcus usually attacked previously healthy valves, only 20 per cent. of the cases showing evidence of pre-existing valvular disease. The cardiac involvement was not restricted to the endocardium, and endaortitis, pericarditis, and myocarditis were not unusual. According to Dr. Thayer, gonorrhœal endocarditis is generally a malignant process with a progressive and fatal course. All his cases proved fatal, but a few instances have been reported of acute endocarditis in which gonococci have been cultivated from the blood ending in recovery.

[1] Bulletin of the Johns Hopkins Hospital, October, 1922.

CHILD WELFARE MOVEMENT IN THE UNITED STATES.

IF the child welfare movement started later in the United States than in this country, and has not therefore progressed so far, there is no doubt that to-day both the American public and medical profession are thoroughly alive to the need for the conservation of infant and child life, and for the provision of all that leads thereto. The *Boston Medical and Surgical Journal* recently contained the report of a meeting of the Massachusetts Medical Society held in Boston, at which Dr. Eugene B. Kelley read a paper dealing with hygiene movements in their relation to the American child. He pointed out that in Great Britain the child welfare movement had developed with rapidity during the past few years, drawing attention to the action of the British Ministry of Health, which, recognising the fundamental importance of bringing up children in the most healthy manner, has established or encouraged the establishment of maternity and infant welfare centres in all parts of the country. Dr. Kelley might also have referred with good reason to the splendid work in similar directions being done by the medical service of the Board of Education.

By infant hygiene we imply the proper care of the child before school age, and all know that many of the defects with which children of school age are afflicted might have been prevented by skilled supervision and remedial measures during the first five years of life. The critical poverty period of the working-class family occurs at the time when the mother is bearing children, and forms the strongest plea for the establishment and multiplication of maternity and infant welfare centres. Dr. Kelley supplies a table which shows the rate of growth of the maternal and child hygiene movement in England and Wales in recent years as reflected in the statistics of the number of infant welfare centres, the number of nurse workers, and the infant mortality rate. Dr. William J. Cox, writing in the *Journal of State Medicine*, June, 1921, on the infant welfare centre as a factor in social evolution, states that at least 40 per

cent. of the infant mortality in England could be avoided if the health conditions of infant life in general could be approximated to those which obtain among the professional classes. The maternity and child welfare centre can do much to bring about this approximation by disseminating among mothers right ideas concerning infant care. However, there is general agreement among all interested in the question that the careful conduct of infant and child hygiene is a most essential factor in the well-being and prosperity of a nation, and the gist of Dr. Kelley's article lies in the query as to what part the medical profession is to take in this movement in the United States, where, it seems, there is a definite tendency towards non-medical leadership in the movements. He insists consequently that medical men who intend to specialise in the treatment of children must be thoroughly trained and acquire special information, remembering, however, that child hygiene is not the exclusive preserve of the specialist, but one of the finest fields for general practice.

MATERNAL MORTALITY IN CHILDBIRTH.

FROM a monthly review of vital statistics for October, issued by the Department of Health, we learn that during the first eight months of the current year 134 deaths from puerperal septicæmia were registered within the area of New York State, with an estimated population of 10½ millions and 20,500 live births in the year. The improvement over last year, when 168 deaths were registered during the same period, is sufficiently striking. Nevertheless, 101 cases against 62 of the same disease were notified, a fact which Dr. Hermann M. Biggs regards, not as significant of increased prevalence, but rather of improvement in the reporting of diagnosed cases. He ascribes this improvement in case reporting to the efforts of the State Department. As the mortality from puerperal septicæmia is highest in the winter months, he considers it as probable that the deaths for the entire year will be very much below that of the two preceding years. It is only in the septic causes of maternal mortality that improvement is noted. Causes such as hæmorrhage, accidents of pregnancy, convulsions, embolism, and sudden death show no important change thus far in 1922 as compared with 1921. The trend of these figures may be instructively compared with those in Wales, on which Prof. E. J. Maclean made comment at a recent meeting (see p. 1071) of the Cardiff Medical Society. In Wales septic maternal mortality has been unduly high, it is not fully reported, and it is now apparently diminishing. Whether or not this mortality bears any relation, as the Registrar-General suggests, to a high incidence of erysipelas, there is no doubt whatever that the greater part of it can be avoided by the measures set forth by Dr. T. Watts Eden at a recent meeting of the Midland Medical Society and fully reported in our columns last week.

MEDICINE AT THE POLLS.

NOT in this country alone are medical men and women just now competing for influence in the councils of a nation. In three of the United States of America the success of those championing the proper safeguarding of medical advances is of even greater moment, perhaps, than in our own Parliamentary contest, for the planks on which the elections are being fought have a direct and vital bearing on medical progress. In Colorado and California, according to the *Journal of the American Medical Association* for Oct. 28th, one of the questions at issue is whether medical research involving the use of living animals shall be prohibited. In Washington a referendum is being taken whether or not to restrict the activities of health authorities with respect to the sanitary and hygienic control of the schools. In 1921 an Act was passed in this State granting to parents the power of forbidding examination of their children in schools by the health authorities. In view of the obvious danger to the State of such personal freedom the Act has now been submitted to a plebiscite of the inhabitants. There are other dangers which have to be combated by those concerned with the promotion of medical science in the U.S.A. The *Journal* points out various ways in which misguided people in that country are attempting to hamper research by the insertion of insidious clauses into comprehensive Bills, where their real purport may be obscured. We may indeed be grateful that the liberty of scientific medicine in this country is safeguarded by the watchfulness of the Research Defence Society,[1] which deserves all the support which medical men and women can give it. That the activities of those who are trying to prevent vaccination has not yet resulted in a widespread outbreak of small-pox is due only to the strenuous efforts of public health authorities and practitioners working in collaboration, efforts which at the least must deflect energies needed for other important work. The Society have chosen well in naming their quarterly publication "*The Fight Against Disease.*" The fight is against physical and mental disease, including the disorder of mind which cannot see the truth when it is made plain. It may be hoped that in the new Parliament ground may have been gained by those whose minds are open to the claims of scientific and preventive medicine.

AT YPRES, 1914.

IN our advertisement columns we publish to-day a request for information concerning Trooper J. L. Pumphrey, Northumberland Yeomanry, who was wounded in the head on Oct. 24th, 1914, at Polygon Wood; he is supposed to have been sent by the Fourth Field Ambulance to the Convent School of Saint-Charles, between Potyze and Verlorenhoek, and to have died there. In the early stage of the war, on the top of struggles and disasters which need not be recapitulated, the tally of the wounded was necessarily taken in an imperfect manner. The purport of the advertisement is that someone in authority, either at the field ambulance or at the temporary hospital, may have some personal recollection of the man in question.

WE regret to announce the death at the age of 73 years, of Dr. Robert Milne, from 1880 to 1920 medical officer to Dr. Barnardo's Homes and Hospitals, and whose name is associated with measures for the home treatment of the common exanthems.

AN occasional lecture will be given at the Royal Society of Medicine on Wednesday, Nov. 22nd, at 5 P.M. by Dr. Hans Christian Jacobæus, professor of internal medicine at Stockholm, on the Practical Importance of Thoracoscopy, especially in the Pneumothorax Treatment of Pulmonary Tuberculosis. Cases will be shown and instruments exhibited.

[1] 11, Chandos-street, Cavendish-square, London, W. 1. Subscription for membership 10*s.* per annum.

HUNTERIAN SOCIETY.—A meeting of this society will be held on Nov. 20th, at 9 P.M., at the Cutlers' Hall, Warwick-lane, Newgate-street, when Dr. Porter Phillips will read a paper on the Position of Insanity in Criminal Law. A discussion will follow. Members of the medical profession and of the Medico-Legal Society are invited to attend.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH.—At a meeting held on Nov. 7th, with Sir Robert Philip, President, in the chair, John Ronald Currie, M.D. Glasg., Harry Andrew Foy, L.R.C.P. & S. Edin., L.R.F.P.S. Glasg., Gustav Lange, M.D. Edin., Nathaniel Hirschman, M.D. Edin., and Henry James Parish, M.B., Ch.B. Edin., were elected to the Membership of the College. The Honorary Fellowship of the College was conferred on Prof. J. Bordet, Institut Pasteur, Brussels, on account of his distinguished services to medical science, and the Honorary Membership of the College was conferred upon Sir Temulji Nariman, the Fort, Bombay, in recognition of his services to medical education in India.

THE NEW TREATMENT OF DIABETES BY INSULIN.

A STATEMENT FROM THE MEDICAL RESEARCH COUNCIL.

RECENT scientific work in the laboratories of the University of Toronto has led to the trial of a new treatment for diabetes mellitus, which consists in the administration of a substance known as insulin, present in an extract made by a new method from the pancreas of the ox, pig, or sheep. The authorities of the University have taken special measures, appropriate to an exceptional situation, to protect and control the manufacture and use of this substance in Canada and the United States, and they have offered as a free gift to the Medical Research Council all rights in a patent covering the product and the process of its preparation, for which application has been filed in this country on behalf of the University of Toronto. The University has done this with the object of putting into the Council's hands the means of exercising the same powers of control over the preparation of this important new substance for trial in this country as the University has found it desirable in the public interest to exercise in the American continent. Representatives of the Council have recently visited, by the courtesy of the University, the various centres of work in Canada and the United States and have examined closely the progress already made there, with a view to finding the conditions under which the production of insulin for a careful trial of its properties may best be accelerated in this country. In view of the great importance and growing interest of this subject both to the public and to the medical profession, the Medical Research Council, who have accepted the generous offer of the University of Toronto, desire to make a public statement of the present situation and of the considerations by which their own policy is being guided.

It should be said at the outset that the new substance insulin is not yet available in this country in any form. It is being made on a moderate scale at Toronto, and on a small experimental scale in one or two laboratories in the United States, and these sources of supply are hardly sufficient for the daily needs of the diabetic patients selected for experimental treatment at those places. Under control and guidance from Toronto, manufacture by one American firm is being developed upon a large scale, but no supply at all is yet available for the medical profession in general. The preparation and administration of insulin are alike still in the experimental stage. There can be no doubt that the new treatment opens a bright prospect of relief, of longer life and less severe deprivation, to many of the sufferers from a very distressing and hitherto intractable disease. The improvement of the methods of the preparation and administration of insulin, and the determination of the limits of its efficacy—whether in any cases and by any method of application it can effect a permanent cure, or only, as hitherto, relieve at each administration an incurable defect—these are matters urgently demanding further research.

The active pancreatic principle is of unknown chemical nature, and it is easily destroyed in the course of its extraction. The possibilities of the new treatment have sprung from the discovery of a method whereby this active substance can be extracted and freed from concomitants which, when ordinary methods are used, lead to its rapid destruction. A process which succeeds on an experimental scale in the laboratory, presents new and much more serious difficulties on a large scale in the factory. Even under the best conditions yet available, it appears that great variations in activity may occur between individual batches of the extract made without any known variation of the process. While the use of an inactive preparation would bring painful disappointment to the patient and bring the treatment into undeserved discredit, the use of a preparation of unexpectedly high potency may be definitely dangerous. No indication of the activity, and so of the remedial value, can be obtained, except by tests of the potency of each sample, previous to its actual use for a patient in the hospital ward, and these require a well-equipped physiological and biochemical laboratory. The degree of permanence and conditions of stability of the extract are as yet practically unknown. In face of these conditions, to leave the production of the remedial extract to unassisted and uncontrolled commercial enterprise would be to imperil the credit and success of the treatment, and entail for many sufferers not only disappointment but serious danger. Apart from any of the obvious possibilities of improper exploitation, it is clear that even preparations made with a conscientious effort to adhere to the methods and precautions so far indicated by the discoverers might prove to be at once useless and harmful.

In these circumstances the Medical Research Council have considered it their duty to use any means placed at their disposal for safeguarding, while accelerating, the proper production of this remedy. They are already arranging for the preparation of insulin for trial and study at several hospital centres where the necessary facilities exist. The scientific workers who accept this responsibility will undertake to work as members of a coördinated team in close touch with the National Institute for Medical Research at Hampstead, with a view to the most rapid progress towards improved methods of preparing and of using the extract. At the same time, and independently of this immediate research work, the Council are considering under what conditions it may be possible to grant licences to private institutions or factories having proper facilities for making and testing the extract. It may be that some of the existing commercial organisations may find it possible to deal satisfactorily with the problem of providing insulin and of keeping pace with the demand. This will grow rapidly and continuously if the methods of treatment and precautions against danger become so simplified by research work that the remedy can pass into general, as distinguished from hospital or specialist, practice. It may prove, on the other hand, that the needs of the situation can best be met by a special organisation, established with the primary aim of relieving the many sufferers from diabetes, and with no view to making profits on an ordinary commercial basis. If this should prove to be the most effective method for providing the remedy, money for its establishment would be needed. The Medical Research Council have no funds at present which they could apply to such a purpose.

The intention of the Council is to promote, in the light of recent experience in Canada and of such new knowledge as research will gain, whatever enterprise or organisation is best fitted for securing the earliest production of the insulin extract under proper conditions of safety and control, and so to facilitate, with the least possible delay, a thorough and scientific trial of the new treatment in this country.

MEDICINE AND THE LAW.

Heart Failure under the Workmen's Compensation Act.

AN interesting decision was recently given by the Court of Appeal in a case under the Workmen's Compensation Act, in which the county court judge's decision at Pontypool in favour of a miner's widow was unanimously upheld. The man had gone to his work in his usual health, which apparently was not known to be unsound, in very severe weather. Arrived at the pit-top, which was high up on a mountain, he had been ordered to shovel snow at 7.30 A.M. and had done so for an hour and a half, after which he had rested by a fire for half an hour

complaining of the cold. On leaving the hut where he had been resting he walked for a hundred yards, fell down, and died. The medical witnesses before the county court judge ascribed death to heart failure, and his honour held that it was caused by an accident arising out of and in the course of employment.

The appeal, as stated by the Master of the Rolls, was based on two grounds: (1) That there was no evidence that death was due to doing heavy work in very severe weather, and (2) that if there was, that was not evidence of an accident arising "out of and in the course of the employment." Post-mortem examination had revealed no trace of anything to cause the heart failure ascribed to the work or the weather. On the side of the appellant employers medical evidence had been called as to the absence of post-mortem appearances which might have been expected if death had been caused by exhaustion. The county court judge, however, had decided as a fact that the heart failure was caused by great exertion in extreme cold. The question followed whether the death arose out of and in the course of the employment. The Master of the Rolls found himself unable to hold that the deceased working as described in a blizzard was not subject to a greater risk than any member of the general public who was out in the same weather. He came to the conclusion that death was due to an accident arising out of and in the course of the miner's employment, and that the appeal must be dismissed as stated above. Lords Justices Warrington and Younger concurred.

Women Jurors and Evidence as to Sexual Acts.

There is a large class of cases tried by juries in assize courts, and occasionally in civil courts, in which evidence has to be given of alleged acts of a lascivious character and sometimes of a bestial nature. Recently three women summoned on a jury in the High Court were told that the case for them to try was one of slander alleging acts of indecency between two male persons, and that they need not sit to try it. Two remained, one of whom said that as they had been summoned they regarded it as their duty to remain, and Mr. Justice McCardie, although dwelling upon the difficulty of the position, expressed his respect for their attitude. On the one hand, he pointed out, it was a matter of duty; on the other hand, there was a question of how far it was wise to maintain the ideal of women as purer and more dignified in the eyes of men through ignorance of the grimmer facts of life. The point is, no doubt, one upon which men and women hold divergent views, even though we may have passed far from the day of thinking that women ought not to be trained in medical schools, or even to draw from nude models in schools of art. It may be observed however, that medical women and artists undergo training which enables them, after a short time, to look as a matter of course upon things which would shock a more sheltered class, such as a woman might be who is taken from her daily duties to sit on a jury. From this point of view women may be less cool and judicial in determining matters that are comparatively new to them than are men who from boyhood have been accustomed to hear of their existence, and to hear them discussed with an outspokenness that certainly obtains, however regrettable.

Doctors and the Speed Limit.

A medical practitioner was recently summoned at Marlborough-street police-court for exceeding the speed limit when motoring through Hyde Park. He satisfied the magistrate, Mr. d'Eyncourt, that he was, in fact, hurrying to a patient in response to an urgent summons, and he was able to show that if he had not exceeded the speed limit he might have been too late to save his patient's life. No fine was inflicted, but he was ordered to pay the costs. The generally expressed opinion of the lay public, who, after all, are most concerned, seems to be that in the circumstances admitted a medical man should be allowed to exceed the speed limit imposed upon others. A suggestion has been made that the doctor's car should bear a distinguishing mark. It would appear to be not only possible but reasonable to allow a certain degree of latitude to medical men, subject, of course, to liability on their part for abuse of any privilege so granted. It will be observed that in this case the practitioner was driving through Hyde Park in the evening, where, of course, there is no crowd of vehicles, and there was no suggestion that he was driving to the public danger. No one, of course, desires to see medical men proceeding to save the life of one person, and at the same time endangering the lives or limbs of others.

NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENT.)

Report on Civil Hospitals in Madras.

THE annual report on the working of the civil hospitals and dispensaries in the Madras Presidency for the year 1921 is a bulky volume, most of the pages of which are occupied with statistical tables of various kinds. There were 739 institutions open on Dec. 31st, 1920; during the year 31 were opened and 28 closed, leaving 742 open on the last day of 1921. Two State public institutions were opened—viz., the headquarters hospital at Palamcottah, in Tinnevelly District, and the Tuberculosis Institute in Madras City. Of the institutions closed during the year three were private non-aided mission dispensaries. Three famine dispensaries were opened in Bellary District, where there was considerable distress owing to failure of crops from lack of rain. The number of beds available for in-patients was 4323 for men and 3135 for women. The number of patients treated was 128,881, an increase of 2971 over the figure for the previous year. The daily average figure for in-patients was 5821·9, against 5813·0 in 1920. The number of out-patients totalled 7,861,732, against 7,672,562 in the previous year. Thus the daily average attendance was 50,028, as compared with 41,198 in 1920. Of the in-patients treated the largest numbers were registered under the headings injuries, diseases of the digestive system, malaria, diseases of the eye, diseases of the generative system, in the order given. The total number of in- and out-patients when divided according to class give the following figures: Hindus, 6,056,281; Mohammedans, 958,703; Europeans and Anglo-Indians, 59,723; other classes, 915,906.

These figures show considerable increases over the previous year, except in the case of the Europeans. The sex distribution was as follows: Men, 4,035,671; women, 1,820,066; male children, 1,196,152; female children, 938,724. Operations performed (on 306,377 patients) numbered 314,055, as compared with 302,384 operations performed in 1920; of these 25,759 were returned as "major."

To enable this work to be carried out a total expenditure of Rs.56,63,845 was incurred, of which Government contributed Rs.27,24,574, local fund and municipal contributions amounting to Rs.24,44,366. From public subscription Rs.1,64,240 were realised. Over Rs.2½ lakhs more were spent in the year for medical officers than in 1920, nearly Rs.½ lakh more for nurses, and almost Rs.1 lakh more for inferior servants, the large increases being mainly due to increased salaries. The number of I.M.S. officers doing duty in the Presidency at the end of 1921 totalled 30, of whom 16 were in Madras City. This number is only about one-half of the sanctioned cadre. In midwifery work 43,211 labour cases were conducted by 544 midwives employed under local boards and municipalities. These insignificant figures sufficiently indicate the crying need for extension of maternity relief in the Presidency. An interesting feature is the existence of district lending medical libraries with a membership of 814. These libraries contain 6329 books and a sum of Rs.6521 was spent on the purchase of up-to-date medical literature. Surgeon-General G. G. Giffard, who writes the report,

visited during the year 15 headquarter hospitals, 21 civil surgeoncies, and 38 hospitals and dispensaries in charge of medical subordinates in various parts of the Presidency.

Madras Medical College Annual Report.

The most remarkable feature of the report for the eighty-seventh session of the College is the table showing the increase in the numbers of students during the last five years. The figures are: 1917–18, 473; 1918–19, 496; 1919–20, 523; 1920–21, 579; 1921–22, 634. It must be remembered, however, that these increases are not entirely due to medical students, as classes for "sanitary inspectors" and "chemists and druggists" are also held in the College buildings, and their numbers are included in these totals. Of the 634 enrolled students, only 418 were actually undergoing training for a medical qualification. Post-graduate courses, junior and senior, for civil assistant surgeons were also held, while

"under the scheme sanctioned in G.O. No. 533, dated 13th May, 1921, regarding the provincialisation of health officers, 15 medical graduates and one L.M.P. candidate were deputed to undergo the health officer's training at Government expense. Fourteen of these qualified for the higher grade of health officers and the L.M.P. candidate for the lower grade."

In the sanitary inspectors' class there were 59 students, and of these 44 passed the Government technical examination. A further batch of sanitary inspectors attended what is known as the quinquennial course of training—a course intended as a refresher course for senior inspectors. There were 63 women students in the College during the year. No less than 55 of these held some form of stipend or scholarship, 51 being Government of Madras stipendiaries. It must be admitted that the Government is doing its best to encourage women to enter the field of medicine. The College library is popular and seems to be well equipped, constant additions being made to the number of books. The percentage of passes at all the University medical examinations was 53·1, as compared with 51·1 during the previous year. In the final examination the pass percentage was well above the average. It is worth noting, also, that the Madras Medical College regularly takes a prominent position in athletics and games, and the year under review was no exception, as many as five inter-collegiate trophies being won. Colonel F. F. Elwes, principal of the College, reports a number of changes in the teaching staff, but these were entirely due to the exigencies of the service and were unavoidable.

Small-pox in Madras City.

The city of Madras during recent years has been repeatedly visited with epidemics of small-pox, and in 1921–22 the fifth epidemic in seven years was experienced, causing 893 deaths out of 2284 attacks during the first six months of 1922. The Government asked for a special report from the health officer of Madras, and this, together with the remarks of the Director of Public Health and the Government review thereon, has now been published. The epidemic which ravaged the city during 1921–22 was the most severe yet experienced during the present century. In Madras City small-pox is endemic, but there must be definite reasons for the increased incidence of recent years. The health officer blames the lymph, yet in four out of the five years for which figures are given the success rate verified by his own staff was over 95 per cent., a remarkably favourable figure. In 1920 the success rate fell to 78·9 per cent., but the vaccination in this year could only affect children who in 1921–22 were under 2 years of age. The tables showing incidence rates among vaccinated and unvaccinated at different age-groups suffer from the incompleteness of data common to most statistics in India. Government in their review say:—

"Either a large number of unvaccinated cases have been returned as vaccinated, or, what is most likely, a large number of cases recorded as successfully vaccinated were insufficiently protected as the result of indifferent work by the vaccinators. That the work of the corporation vaccinators is of uneven quality is implied in the health officer's second report. The remedy lies with the health officer himself under whose supervision they work. . . . The epidemic of 1921–22 is stated to have begun in November, 1921, when 64 attacks were reported. But in March of that year there were 66 attacks, followed by 44 in April, and the rise to 47 in September, and 48 in October was warning enough that there was danger ahead."

Statistics of attacks and prophylactic measures taken for the ten worst affected divisions of the city are tabulated in the Government review, and the remarks on this table are as follows:—

"It can hardly be said that the above figures indicate very vigorous intensive work. The health officer very rightly dwells on the importance of revaccination, a problem which is engaging the attention of Government, and regarding which the public conscience is lamentably weak. Except in Divisions 3, 20, and 28 the out-turn of revaccination in 1921–22 was remarkably poor, and it is worthy of note that revaccination was higher in some of the more lightly affected divisions than in those which suffered most heavily. Whether special efforts were made to protect the fisherfolk, the mill-hands, and other communities most exposed to infection is not reported. It is true that dirty surroundings increase the danger of infection, but such conditions cannot in any way impair the protection afforded by vaccination. The Government hope that the officers of the corporation will take special measures to ensure the protection of those who are most exposed to infection, and that in future reports the special measures taken will not be left in doubt. . . . . It is clear from the reports that the health staff of the corporation was caught napping. It did not wake to the dangers of an epidemic till too late. The rise in attacks in March and April, 1921, was accompanied by a spasmodic rise in primary vaccination, but no attempt seems to have been made to stimulate revaccination, and even primary vaccination declined month by month till October, when it reached its lowest ebb, with an out-turn for the month of only 864. Between March and October, 1921, revaccinations averaged 128 per month. In October the figure was only 89. Under the spur of panic the number of revaccinations in March, 1922, rose to 2439. It is regrettable that this figure was not attained a year earlier. Even after the epidemic established itself the staff failed to keep pace with its progress. Attacks escaped detection, and patients died before the disease could be diagnosed."

The report concludes with the remark that no surprise need be felt that many of the statistics recorded admit of no reasonable explanation. Unless the health staff can be sure of its facts, it cannot hope to eradicate a disease which experience of other countries has proved to be preventable.

Madras, Oct. 18th.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Lt.-Cmdrs. to be Surg. Cmdrs.: H. E. Perkins, E. C. Holtom, J. G. Danson, H. H. Ormsby, E. Moxon-Browne, and A. E. P. Cheesman.

Surg.-Lt. R. K. Shaw to be Surg. Lt.-Cmdr.

Temp. Surg. Lt. (D.) D. C. Eglington is transferred to the permanent list.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Cmdrs. A. R. Brailey, W. K. Wills, and R. J. E. Hanson to be Surg. Capts.

ROYAL ARMY MEDICAL CORPS.

Maj.-Gen. S. G. Moores, late R.A.M.C., is appointed Hon. Surg. to the King, vice Col. (Hon. Maj.-Gen.) W. F. Stevenson, ret. pay, late R.A.M.C. (decd.).

Col. A. H. Morris, late R.A.M.C., retires on ret. pay.

Lt.-Col. (temp. Col.) C. J. O'Gorman, from R.A.M.C., to be Col., vice Col. J. B. Anderson, ret.

Maj. A. S. Littlejohns relinquishes the temp. rank of Lt.-Col. on ceasing to be empld. as Assistant Director of Pathology.

Temp. Capt. A. C. Murray relinquishes his commn. and retains the rank of Capt.

ARMY DENTAL CORPS.

Maj. J. F. Allin, from Gen. List, Reg. Army Res. of Off., to be Lt., and relinquishes the rank of Maj.

MILITIA.

Capt. J. A. O'Driscoll relinquishes his commn. and retains the rank of Capt.

ARMY RESERVE OF OFFICERS.

Lt.-Col. G. S. Mansfield, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

TERRITORIAL FORCE.

Lt. B. Kelly to be Capt.

Capt. V. H. Wardle resigns his commn. and is granted the rank of Maj.

Capt. D. R. E. Roberts resigns his commn. and retains the rank of Capt.

The undermentioned having attained the age limit are retired and retain their rank except where otherwise stated: Majs. G. B. Robinson, C. B. Ker, and M. G. Foster (with permission to wear the prescribed uniform), and Capts. E. A. Goulden, E. C. Plummer (granted the rank of Maj.), H. W. Spaight, E. C. Hobbs, E. M. De Jong, J. A. Willett (granted the rank of Maj.), R. Hitchings, H. M. Harwood, T. S. P. Parkinson, J. T. Williams, R. Lamb, W. A. Hooton, J. Pearson, and J. Stokes.

The undermentioned relinquish their commns. and retain their rank except where otherwise stated: Maj. W. B. Armstrong (with permission to wear the prescribed uniform), Capts. (Bt. Majs.) A. S. M. Macgregor (granted the rank of Maj.), and W. J. Wilson, Capts. J. M. Fonseca, V. J. White, R. Briercliffe (granted the rank of Maj.), N. J. Wigram, W. Stott, C. D. Rogers, R. W. Nevin, B. McKean, H. B. Low (granted the rank of Maj.), F. Arvor (granted the rank of Maj.), C. G. K. Sharp (granted the rank of Maj.), G. Young (granted the rank of Maj.), W. A. Stokes, J. D. Lickley, T. W. Crowley, C. R. Harrison, and J. Rosencwige.

General Hospitals: Lt.-Col. G. S. Jackson resigns his commn. and retains the rank of Lt.-Col., with permission to wear the prescribed uniform. Maj. J. M. Cowan having attained the age limit is retired and is granted the rank of Col. Capt. J. A. Menzies having attained the age limit is retired and retains the rank of Capt.

TERRITORIAL ARMY RESERVE.

Capt. F. Wigglesworth relinquishes his commn. and is granted the rank of Maj.

Capts. H. V. Capon and W. G. Lloyd relinquish their commns. and retain the rank of Capt.

ROYAL AIR FORCE.

Lts. N. F. Smith and H. J. Henderson, Army Dental Surgeons, are granted temporary commns. as Flying Officers on attachment for duty with the R.A.F.

INDIA AND THE INDIAN MEDICAL SERVICE.

The King has approved the admission to the I.M.S. of Capt. D. V. O'Malley, from the R.A.M.C., and Lt. C. V. Falvey.

Lt.-Col. A. A. Gibbs has been confirmed as Assistant Director-General, Indian Medical Services; Lt.-Col. W. R. T. Collinson has been appointed to officiate as Civil Surgeon of the Cachar District; and the services of Lt.-Col. J. C. Robertson and E. L. Perry have been replaced permanently at the disposal of the Commander-in-Chief; Lt.-Col. R. M. Dalziel acts as Inspector-General of Prisons, Bombay Presidency; Lt.-Col. J. C. S. Oxley, Civil Surgeon, Pachmarhi, has been reposted to Nagpur as Civil Surgeon, and Superintendent of the Lunatic Asylum there; Lt.-Col. R. W. Knox has been posted as Residency Surgeon, Hyderabad; Lt.-Col. W. J. Collinson has been temporarily appointed under the Assam Government; and Lt.-Col. W. H. Kenrick has been reposted to Jubbulpore as Civil Surgeon; Lt.-Col. R. A. Lloyd has been appointed Civil Surgeon, Pachmarhi. Maj. R. G. G. Croly, on reversion from military duty, acts as District Medical and Sanitary Officer, North Arcot; Maj. S. S. Vazifdar has been appointed a Member of the Civil and Military Examination Committee for examining candidates in Hindustani; and Maj. E. H. V. Hodge has been appointed Surgeon to the Governor of Bengal; Maj. A. F. Hamilton has been nominated as a Member of the Bombay Medical Council; and Maj. A. N. Dickson holds charge of the Agency Surgeon, Wana, in addition to his duties in Dera Ismail Khan; Maj. M. L. Puri has assumed charge of the office of Civil Surgeon, Rawalpindi, on transfer from Attock; and Capt. L. A. P. Anderson has been appointed Assistant Director, Central Research Institute, Dehar Dun; Capt. H. G. Alexander officiates as Professor of Ophthalmology, Lahore Medical College.

The services of Lt.-Col. W. D. A. Keys have been placed permanently at the disposal of the Government of India. Maj. A. J. H. Russell has been posted as Director of Public Health, Madras. The Governor in Council has appointed Maj. J. M. A. Macmillan, civil surgeon, Hoshangabad, to the Executive and Medical Charge of the District Jail, Hoshangabad. Maj. J. Taylor acts as Director, Bombay Bacteriological Laboratory, vice Lt.-Col. W. Glen Liston. Maj. W. E. R. Williams has been appointed Civil Medical Officer of Roorkee in addition to his own duties, vice Capt. J. W. Jones. Maj. I. D. Jones acts as Surgeon Superintendent, St. George's Hospital, Bombay.

Public Health Services.

SCHOOL CLOSURE IN EPIDEMICS.

A RECENT report on school closure in epidemics, presented to the Newcastle Education Authority, raises once again the question of the advisability of closure, the old bogy of the danger of imperilling the education grant being emphasised. In former years, by an article in the Code known as 101, a grant was allowed for infectious disease, but about the beginning of this century, in spite of protests from the Society of Medical Officers of Health, this was abolished. As the Board of Education now pays a general covering grant on educational work, diminished attendance does not, however, represent the loss that it did in former years. A quarter of a century ago quarantine was insisted on, and schools used to be closed when the percentage attendance had dropped below a certain figure. The history of past endeavour in this direction shows that if recognised early enough measles might be controlled for a time, but that in the case of scarlet fever or diphtheria school closure was on the whole futile as a preventive measure. Even with such a disease as influenza school distribution practically follows the general morbidity, and provided each child is sent home as soon as indisposition is noticed the spread of infection does not appear to be furthered. In urban districts the school plays such a minor part in disseminating disease that closure need only be resorted to in rare circumstances. In the control of an epidemic the school may, indeed, be useful, since by means of advice to parents many of the evil effects of epidemic diseases may be mitigated. Enough use is not generally made of the teacher. Every teacher should have careful instruction as to the course of epidemic disease, the period of incubation, modes of infection, and initial symptoms. An intelligent teacher knows his children well, and can generally tell when the child is not himself in class, can send him home, and supply the mother with instructions to keep the child in bed, to send for the doctor, &c. The school nurse can also help, but no school doctor can afford to ignore the services of the teacher at such times, and the value of a teacher with a knowledge of the course of epidemics can hardly be overestimated.

The real solution of the problem of infectious disease is careful watching, individual exclusions, and in the very rarest circumstances school closure, which in any well-regulated urban community should never be required. Remote country schools present quite a different problem; in these closure may sometimes be a desirable measure.

SCHOOL MEDICAL SERVICE.

Manchester.

THE thirteenth annual report of Dr. A. Brown Ritchie for 1921 contains much useful information. The Manchester school population is given as 125,000. As to examinations and treatment by doctors, 41,084 children underwent medical inspection in schools, 101,319 at school clinics, and 3532 defectives or epileptics had a special examination. As in most educational areas, there is insufficient provision for dull and backward children, and the larger proportion of these children have had to be left in the ordinary school, where they are quite unable to make progress, and where also their presence hinders the work of their fellows. Dr. Ritchie draws attention to the fact that there are two distinct types of the backward child. In the first place, there is the child who differs only in degree of subnormality of intelligence from the feeble-minded child. Such children require a modified curriculum right up to leaving age. Then there is the child whose backwardness may be only temporary, due possibly to ill-health or to late mental development. Sometimes both these last

factors may be the cause of backwardness, and it is obviously unfair to such a child to put him in a class where he is unable to follow and where it is impossible on account of the large numbers for him to receive any individual attention. The others in the class also are seriously handicapped. The school dentists conducted 24,073 examinations in schools, and 22,182 at school clinics. The amount of disease or defect found amongst the children examined in routine is practically the same as in 1920. Amongst minor ailments, 1278 children were referred for treatment for ringworm of the head, 852 for the same disease of the body, 7014 for impetigo, and 752 for scabies (the decrease in scabies is noticeable); 3108 for ear disease and 5026 for eye diseases. Attention is drawn to molluscum contagiosum, which had not previously been specifically classified. Each case conformed to Hutchinson's description "mother-of-pearl shirt-buttons," and the disease seems to be much more common than is generally supposed. Out of 2631 children who attended three clinics, 12 cases were seen, girls and boys being equally affected. The average length of treatment was about two months. During the year, at the tonsil and adenoid clinic, there were 1152 examinations, resulting in 954 operations for adenoids and enlarged tonsils. It was found that the use of ethyl chloride, C. and E. mixture, and ether in succeeding stages, proves efficacious and more satisfactory than ether throughout. For dental treatment four full-time dentists were at work, and to each dentist was allotted a number of schools in the immediate vicinity of his clinic, with a school population of approximately 5000 children. The whole of the children were inspected yearly and the total figures show that 79 per cent. of the children inspected required treatment, 67 per cent. being treated by the school dentist. "Exceptionally, one comes across a child who does clean his teeth." As to "uncleanliness," not more than two general inspections were completed. At the routine medical inspections during 1910, when inspection began, the amount of uncleanliness was 19·2 per cent., in 1914 15·2 per cent., in 1919 15·8 per cent., and in 1921 4·5 per cent. The special classes for stammering children were continued and during the year 51 children received instruction; a revision course was held for former pupils who tended to relapse. As usual, stammering boys were much in excess of girls in number—46 of the former and 5 of the latter. Some interesting observations are recorded on the diagnosis of moral imbecility.[1]

Coventry.

The number of individual children inspected here during the year 1921 was 9655, and of these 5800 required observation or treatment for defects. Dr. E. H. Snell reports that cases of uncleanliness of head show no sign of diminution. There were no school closures for infectious disease. The stammering classes initiated in 1920 have been continued. Each class consists of 10 boys or girls from 10 years upwards, and each class has a course of eight weeks' instruction on the Berquand system. The teacher in charge finds that intelligent coöperation of pupil and parent is absolutely necessary and that a revision class of some kind is essential, as it is practically always found that children tend to relapse after a single initial course.

The results of treatment of 56 children by means of this method were: 28 cured (provisionally), 19 markedly improved, 9 slightly improved. The two classes for dull and backward children reported on last year have been continued. The intelligence quotients worked out in 1920 have proved a fair index of the capacity of these children. Those with a high intelligence quotient improved rapidly and were able to return to the same class in the elementary school as children of their own age: those with a low quotient, although benefiting by the individual and special attention they received, remain at a lower level in their school work.

[1] THE LANCET, Sept. 30th, p. 741.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

FIVE LONDON BOROUGHS.

THE following table gives some of the principal health statistics in 1921:—

Borough.	Estimated population (R.-G.).	Birth-rate.	Death-rates per 1000 of population				Death-rates per 1000 births.		
			All causes.	Tuberculosis.	Cancer.	Respiratory and influenza.	Infant mortality.	Diarrhœa, &c., under 2 years.	Maternal mortality in childbirth.
Bermondsey	120,500	26·8	13·7	1·5	1·3	3·0	95	22	1·8
Chelsea ..	64,290	16·6	13·5	1·1	1·7	—	78	16	—
Deptford ..	113,500	23·5	12·2	1·3	1·3	2·5	88	21	3·0
Greenwich..	101,400	22·4	12·3	1·4	1·2	2·3	77	14	4·8
St. Pancras	212,900	22·4	13·0	1·4	1·4	2·5	76	17	2·7

Note.—Where blanks are left the figure was not available.

Bermondsey.

Dr. R. King Brown mentions that scarlet fever has become a comparatively mild and innocuous disease, and that the question arises as to whether one should not remove fewer cases to hospital in order to provide accommodation for some more deadly disease such as measles. He also comments on the increased prevalence of diphtheria, the case fatality of which shows no signs of diminishing. Dr. Stella Churchill in her report on maternity and child welfare work mentions that the local midwives give valuable support to the new ante-natal clinic by sending up their patients. She is desirous of finding some method of coöperation between the municipal and voluntary workers which will free the former for more home visiting and talks to mothers and ensure more regular attendance from the latter. A dental treatment centre was opened in April, and an effort is being made to make it self-supporting, a scale of fees having been arranged. The report on tuberculosis work points out the great need for institutional provision for advanced cases among the women, and, as an example of the prevailing conditions, is cited a six-roomed house, in which are living three adult consumptives with nine children and two other adults.

Chelsea.

Dr. Louis C. Parkes reports that under his council's scheme 22 necessitous women were provided with a maternity nurse, 57 with a midwife, and 23 with a home-help; and that 25 nursing mothers with their babies were sent away to convalescent homes. Dr. Parkes compares the vital statistics in the population numbering 6767 of the municipal and trust buildings and the population, numbering 3480, of seven poor-class streets. In the former the birth-rate is 16·4, the death-rate 11·1, and the infant mortality-rate 81. In the latter the birth-rate is 23·3, the death-rate 15·8, and the infant mortality-rate 99. Dr. Parkes doubts the advisability of the large expenditure incurred by hospital isolation of 90 per cent. of the scarlet fever cases now that this disease has become so mild. In 1891–95 the deaths from tuberculosis formed 13·5 per cent. of the total deaths and the deaths from cancer 4·2 per cent. In 1916–20 the deaths from tuberculosis formed 10 per cent. of the total deaths and the deaths from cancer 9·1 per cent.

Deptford.

Dr. Charles S. Thomson (who only entered upon his duties late in Nov., 1921) records the opening of the municipal maternity home in Wickham-road, and his report contains several pleasing illustrations of the new institution. He points out that, in present conditions of overcrowding, the only hope of reducing the high maternal mortality in childbirth is by the establish-

ment of such homes. The ante-natal clinic is so well patronised that a new session is needed. Dr. N. M. Donnelly, the tuberculosis officer, finds great difficulty in getting parents to bring up "contacts" and offers the suggestion that when a case of tuberculosis is notified, the parent should have to furnish to the medical officer of health a certificate stating that all the contacts have been medically examined. Such certificate would, of course, be provided free at the dispensary. As in many other districts there is failure in prompt notification. Thus, of the 121 cases of pulmonary tuberculosis which ended fatally during 1921, 27 were unnotified, 10 were notified at death, while only 44 were notified more than six months before death.

Greenwich.

Dr. E. G. Annis reports that refuse is disposed of by "barging" and by dumping on low-lying marsh land, that the dumps are practically filled up and are becoming a serious menace to health, and that the council have now approved a scheme for the erection of an up-to-date refuse destructor. He describes a curious application from a cow-keeper, whose scheme was to supply Grade A milk from one portion of his herd and ordinary milk from the other portion, to which were to be relegated the cows rejected by the tuberculin test. The effect of the scheme, which was not carried out, would obviously have been to increase the proportion of cows affected by some degree of tuberculosis in the second portion of the herd and thus increase the danger of tuberculous milk for the customers who obtained "ordinary" milk. The Ministry's scheme for preventing abuse in the distribution of free milk has been in operation, and in three cases where misstatements were made in the endeavour to obtain free milk proceedings were taken and fines inflicted. Dr. Annis considers that a guaranteed full cream dried milk is preferable to ordinary milk because it is uniformly clean and contains a minimum of harmful bacteria. A maternity home is badly needed owing to overcrowding, and during the year arrangements were made for the purchase of Kidbrooke House, formerly a nursing institution, and its adaptation for the purpose. An agreement has been made with the County Council whereby the borough officers take over the duties of the Infant Welfare Protection Visitors, and thus duplication of work is avoided. During the year, after considerable negotiation, the Ministry agreed to a contract being entered into for the erection of 190 additional houses, 55 of which have been completed and occupied. Dr. Annis is anxious that a low-lying unsanitary area in Charlton, occupied by about 1000 persons and liable to sewage-flooding, should be dealt with, but it has been decided to take no action in the matter. He mentions a difficulty which has arisen in regard to the housing question. Certain owners were taken into court because they had not carried out necessary trifling repairs, but the magistrate, on the application of the owners, made closing orders. Owing to the shortage of houses the closing orders cannot be enforced, the houses remain occupied, and the repairs undone.

St. Pancras.

Dr. T. Shadick Higgins says that the year 1921 was remarkable for unemployment and the exceptional heat and drought. Considering these two factors, the infant mortality-rate was satisfactory, 76 as compared with 73 in 1920. He submits a chart, covering the years 1904 to 1921, which shows that the diarrhœa mortality does not vary in recent years with the height of the 4-foot earth thermometer nearly so closely as in the earlier part of the period. There was considerable prevalence in the borough of mild scarlet fever and severe diphtheria. The shortage of houses continues and cases of overcrowding and the illegal occupation of underground rooms as sleeping places cannot be dealt with in many instances. The great problem in St. Pancras is the compression of several families into single houses originally intended for one family only which have never been altered. Dr. Higgins points out that at the 1911 Census 22,246 inhabited houses were occupied by 52,994 families; there were 11,452 one-room, 15,568 two-room, and 10,421 three-room tenements; and a population of 51,214 were living in 8875 tenements with more than two occupants to a room. Of the 101 notified cases of ophthalmia neonatorum five resulted in damaged sight. In these five cases the health department was either unable to exercise early supervision or its advice was disregarded. An interesting account is given of the Brookfield Housing Estate. The scheme is exceptional in that it provides accommodation for as many as 20 tenancies to the acre and at the same time gives large gardens and ample open space about and around the buildings, this being only possible by adopting as a principle the combined use of flats and maisonettes, thus saving actual building-site area on land too costly for the usual lay-out of groups of houses. The flats in Prince of Wales-road were opened in February of the present year, and the maintenance of the hot water-supply has proved very costly up to now.

Correspondence.

"Audi alteram partem."

THE WANT OF UNIFORMITY IN HOSPITAL ACCOUNTING.

To the Editor of THE LANCET.

SIR,—The rapid growth of the science of accountancy and the general demand for uniformity in statistical method have greatly emphasised the need for reorganisation of the system upon which hospital accounts are now kept. Judgment as to the economical running of a hospital must, in nearly every case, at present rest largely upon the information contained in the annual accounts and statistical tables supplied by the various hospitals, and the merit of the results obtained by comparison of these figures depends primarily upon the correctness of the methods employed to arrive at the final figures shown.

The remedy lies in the adoption by all hospitals of a complete system of accounting on up-to-date business lines. There is good reason to believe that a wide desire does exist, especially among the larger hospitals, for the keeping of as full and complete accounts as possible and for the adoption of means for securing their accuracy and efficiency. This zeal may, however, tend in some cases rather to the multiplication of books and records than to that interdependence of the accounts in a connected system by which alone real efficiency can be obtained. On the other hand, no doubt, there are many instances where the accounts are inadequate, and where the proper supervision of the financial transactions through their various stages is neglected, owing to the indifference of the authorities and the want of training of the responsible officers. Having regard to all the circumstances, it is not surprising that there have sprung up variations of every kind and degree of importance not merely in method but in principle. This tendency has, however, been checked to some extent by the influence of the King's Fund as regards the accounts which are subject to their regulations, and by the prescribed form of returns which must be rendered to them annually.

The time has arrived when the various associations of members of hospital authorities and their financial officers should make strenuous efforts to raise the standard of efficiency of hospital accounting, and to secure a general uniformity in their presentation. Apart from the London hospitals subject to the King's Fund, it is evident that hospital accounts are not kept on any uniform system but on various systems. While the larger hospitals incline towards a more or less comprehensive system of income and expenditure the smaller hospitals use the system of cash receipts and cash payments, and in some cases a system of receipts and expenditure is in use but under various modified interpretations.

factors may be the cause of backwardness, and it is obviously unfair to such a child to put him in a class where he is unable to follow and where it is impossible on account of the large numbers for him to receive any individual attention. The others in the class also are seriously handicapped. The school dentists conducted 24,073 examinations in schools, and 22,182 at school clinics. The amount of disease or defect found amongst the children examined in routine is practically the same as in 1920. Amongst minor ailments, 1278 children were referred for treatment for ringworm of the head, 852 for the same disease of the body, 7014 for impetigo, and 752 for scabies (the decrease in scabies is noticeable); 3108 for ear disease and 5026 for eye diseases. Attention is drawn to molluscum contagiosum, which had not previously been specifically classified. Each case conformed to Hutchinson's description "mother-of-pearl shirt-buttons," and the disease seems to be much more common than is generally supposed. Out of 2631 children who attended three clinics, 12 cases were seen, girls and boys being equally affected. The average length of treatment was about two months. During the year, at the tonsil and adenoid clinic, there were 1152 examinations, resulting in 954 operations for adenoids and enlarged tonsils. It was found that the use of ethyl chloride, C. and E. mixture, and ether in succeeding stages, proves efficacious and more satisfactory than ether throughout. For dental treatment four full-time dentists were at work, and to each dentist was allotted a number of schools in the immediate vicinity of his clinic, with a school population of approximately 5000 children. The whole of the children were inspected yearly and the total figures show that 79 per cent. of the children inspected required treatment, 67 per cent. being treated by the school dentist. "Exceptionally, one comes across a child who does clean his teeth." As to "uncleanliness," not more than two general inspections were completed. At the routine medical inspections during 1910, when inspection began, the amount of uncleanliness was 19·2 per cent., in 1914 15·2 per cent., in 1919 15·8 per cent., and in 1921 4·5 per cent. The special classes for stammering children were continued and during the year 51 children received instruction; a revision course was held for former pupils who tended to relapse. As usual, stammering boys were much in excess of girls in number—46 of the former and 5 of the latter. Some interesting observations are recorded on the diagnosis of moral imbecility.[1]

Coventry.

The number of individual children inspected here during the year 1921 was 9655, and of these 5800 required observation or treatment for defects. Dr. E. H. Snell reports that cases of uncleanliness of head show no sign of diminution. There were no school closures for infectious disease. The stammering classes initiated in 1920 have been continued. Each class consists of 10 boys or girls from 10 years upwards, and each class has a course of eight weeks' instruction on the Berquand system. The teacher in charge finds that intelligent coöperation of pupil and parent is absolutely necessary and that a revision class of some kind is essential, as it is practically always found that children tend to relapse after a single initial course.

The results of treatment of 56 children by means of this method were: 28 cured (provisionally), 19 markedly improved, 9 slightly improved. The two classes for dull and backward children reported on last year have been continued. The intelligence quotients worked out in 1920 have proved a fair index of the capacity of these children. Those with a high intelligence quotient improved rapidly and were able to return to the same class in the elementary school as children of their own age: those with a low quotient, although benefiting by the individual and special attention they received, remain at a lower level in their school work.

[1] THE LANCET, Sept. 30th, p. 741.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

FIVE LONDON BOROUGHS.

THE following table gives some of the principal health statistics in 1921:—

Borough.	Estimated population (R.-G.).	Birth-rate.	Death-rates per 1000 of population				Death-rates per 1000 births.		
			All causes.	Tuberculosis.	Cancer.	Respiratory and influenza.	Infant mortality.	Diarrhœa, &c., under 2 years.	Maternal mortality in childbirth.
Bermondsey	120,500	26·8	13·7	1·5	1·3	3·0	95	22	1·8
Chelsea ..	64,290	16·6	13·5	1·1	1·7	—	78	16	—
Deptford ..	113,500	23·5	12·2	1·3	1·3	2·5	88	21	3·0
Greenwich..	101,400	22·4	12·3	1·4	1·2	2·3	77	14	4·8
St. Pancras	212,900	22·4	13·0	1·4	1·4	2·5	76	17	2·7

Note.—Where blanks are left the figure was not available.

Bermondsey.

Dr. R. King Brown mentions that scarlet fever has become a comparatively mild and innocuous disease, and that the question arises as to whether one should not remove fewer cases to hospital in order to provide accommodation for some more deadly disease such as measles. He also comments on the increased prevalence of diphtheria, the case fatality of which shows no signs of diminishing. Dr. Stella Churchill in her report on maternity and child welfare work mentions that the local midwives give valuable support to the new ante-natal clinic by sending up their patients. She is desirous of finding some method of coöperation between the municipal and voluntary workers which will free the former for more home visiting and talks to mothers and ensure more regular attendance from the latter. A dental treatment centre was opened in April, and an effort is being made to make it self-supporting, a scale of fees having been arranged. The report on tuberculosis work points out the great need for institutional provision for advanced cases among the women, and, as an example of the prevailing conditions, is cited a six-roomed house, in which are living three adult consumptives with nine children and two other adults.

Chelsea.

Dr. Louis C. Parkes reports that under his council's scheme 22 necessitous women were provided with a maternity nurse, 57 with a midwife, and 23 with a home-help; and that 25 nursing mothers with their babies were sent away to convalescent homes. Dr. Parkes compares the vital statistics in the population numbering 6767 of the municipal and trust buildings and the population, numbering 3480, of seven poor-class streets. In the former the birth-rate is 16·4, the death-rate 11·1, and the infant mortality-rate 81. In the latter the birth-rate is 23·3, the death-rate 15·8, and the infant mortality-rate 99. Dr. Parkes doubts the advisability of the large expenditure incurred by hospital isolation of 90 per cent. of the scarlet fever cases now that this disease has become so mild. In 1891–95 the deaths from tuberculosis formed 13·5 per cent. of the total deaths and the deaths from cancer 4·2 per cent. In 1916–20 the deaths from tuberculosis formed 10 per cent. of the total deaths and the deaths from cancer 9·1 per cent.

Deptford.

Dr. Charles S. Thomson (who only entered upon his duties late in Nov., 1921) records the opening of the municipal maternity home in Wickham-road, and his report contains several pleasing illustrations of the new institution. He points out that, in present conditions of overcrowding, the only hope of reducing the high maternal mortality in childbirth is by the establish-

ment of such homes. The ante-natal clinic is so well patronised that a new session is needed. Dr. N. M. Donnelly, the tuberculosis officer, finds great difficulty in getting parents to bring up "contacts" and offers the suggestion that when a case of tuberculosis is notified, the parent should have to furnish to the medical officer of health a certificate stating that all the contacts have been medically examined. Such certificate would, of course, be provided free at the dispensary. As in many other districts there is failure in prompt notification. Thus, of the 121 cases of pulmonary tuberculosis which ended fatally during 1921, 27 were unnotified, 10 were notified at death, while only 44 were notified more than six months before death.

Greenwich.

Dr. E. G. Annis reports that refuse is disposed of by "barging" and by dumping on low-lying marsh land, that the dumps are practically filled up and are becoming a serious menace to health, and that the council have now approved a scheme for the erection of an up-to-date refuse destructor. He describes a curious application from a cow-keeper, whose scheme was to supply Grade A milk from one portion of his herd and ordinary milk from the other portion, to which were to be relegated the cows rejected by the tuberculin test. The effect of the scheme, which was not carried out, would obviously have been to increase the proportion of cows affected by some degree of tuberculosis in the second portion of the herd and thus increase the danger of tuberculous milk for the customers who obtained "ordinary" milk. The Ministry's scheme for preventing abuse in the distribution of free milk has been in operation, and in three cases where misstatements were made in the endeavour to obtain free milk proceedings were taken and fines inflicted. Dr. Annis considers that a guaranteed full cream dried milk is preferable to ordinary milk because it is uniformly clean and contains a minimum of harmful bacteria. A maternity home is badly needed owing to overcrowding, and during the year arrangements were made for the purchase of Kidbrooke House, formerly a nursing institution, and its adaptation for the purpose. An agreement has been made with the County Council whereby the borough officers take over the duties of the Infant Welfare Protection Visitors, and thus duplication of work is avoided. During the year, after considerable negotiation, the Ministry agreed to a contract being entered into for the erection of 190 additional houses, 55 of which have been completed and occupied. Dr. Annis is anxious that a low-lying unsanitary area in Charlton, occupied by about 1000 persons and liable to sewage-flooding, should be dealt with, but it has been decided to take no action in the matter. He mentions a difficulty which has arisen in regard to the housing question. Certain owners were taken into court because they had not carried out necessary trifling repairs, but the magistrate, on the application of the owners, made closing orders. Owing to the shortage of houses the closing orders cannot be enforced, the houses remain occupied, and the repairs undone.

St. Pancras.

Dr. T. Shadick Higgins says that the year 1921 was remarkable for unemployment and the exceptional heat and drought. Considering these two factors, the infant mortality-rate was satisfactory, 76 as compared with 73 in 1920. He submits a chart, covering the years 1904 to 1921, which shows that the diarrhœa mortality does not vary in recent years with the height of the 4-foot earth thermometer nearly so closely as in the earlier part of the period. There was considerable prevalence in the borough of mild scarlet fever and severe diphtheria. The shortage of houses continues and cases of overcrowding and the illegal occupation of underground rooms as sleeping places cannot be dealt with in many instances. The great problem in St. Pancras is the compression of several families into single houses originally intended for one family only which have never been altered. Dr. Higgins points out that at the 1911 Census 22,246 inhabited houses were occupied by 52,994 families; there were 11,452 one-room, 15,568 two-room, and 10,421 three-room tenements; and a population of 51,214 were living in 8875 tenements with more than two occupants to a room. Of the 101 notified cases of ophthalmia neonatorum five resulted in damaged sight. In these five cases the health department was either unable to exercise early supervision or its advice was disregarded. An interesting account is given of the Brookfield Housing Estate. The scheme is exceptional in that it provides accommodation for as many as 20 tenancies to the acre and at the same time gives large gardens and ample open space about and around the buildings, this being only possible by adopting as a principle the combined use of flats and maisonettes, thus saving actual building-site area on land too costly for the usual lay-out of groups of houses. The flats in Prince of Wales-road were opened in February of the present year, and the maintenance of the hot water-supply has proved very costly up to now.

Correspondence.

"Audi alteram partem."

THE WANT OF UNIFORMITY IN HOSPITAL ACCOUNTING.

To the Editor of THE LANCET.

SIR,—The rapid growth of the science of accountancy and the general demand for uniformity in statistical method have greatly emphasised the need for reorganisation of the system upon which hospital accounts are now kept. Judgment as to the economical running of a hospital must, in nearly every case, at present rest largely upon the information contained in the annual accounts and statistical tables supplied by the various hospitals, and the merit of the results obtained by comparison of these figures depends primarily upon the correctness of the methods employed to arrive at the final figures shown.

The remedy lies in the adoption by all hospitals of a complete system of accounting on up-to-date business lines. There is good reason to believe that a wide desire does exist, especially among the larger hospitals, for the keeping of as full and complete accounts as possible and for the adoption of means for securing their accuracy and efficiency. This zeal may, however, tend in some cases rather to the multiplication of books and records than to that interdependence of the accounts in a connected system by which alone real efficiency can be obtained. On the other hand, no doubt, there are many instances where the accounts are inadequate, and where the proper supervision of the financial transactions through their various stages is neglected, owing to the indifference of the authorities and the want of training of the responsible officers. Having regard to all the circumstances, it is not surprising that there have sprung up variations of every kind and degree of importance not merely in method but in principle. This tendency has, however, been checked to some extent by the influence of the King's Fund as regards the accounts which are subject to their regulations, and by the prescribed form of returns which must be rendered to them annually.

The time has arrived when the various associations of members of hospital authorities and their financial officers should make strenuous efforts to raise the standard of efficiency of hospital accounting, and to secure a general uniformity in their presentation. Apart from the London hospitals subject to the King's Fund, it is evident that hospital accounts are not kept on any uniform system but on various systems. While the larger hospitals incline towards a more or less comprehensive system of income and expenditure the smaller hospitals use the system of cash receipts and cash payments, and in some cases a system of receipts and expenditure is in use but under various modified interpretations.

The chief causes of this want of uniformity are: (1) the vague terminology of regulations governing systems of accounts generally; (2) absence of sufficiently precise regulations and definitions; (3) the increasing sense of the inadequacy of the purely cash system of accounting. There is little uniformity as regards the form in which the final accounts are prepared, and as these accounts are compiled from data derived from different systems of accounts the statistical information thus obtained is not uniform, nor is it capable of comparison. Further, the accounts do not in every case show the true financial position of the hospitals concerned.

With regard to No. 3 above, this point is one deserving the serious attention of the authorities of all the larger hospitals. The weaknesses inherent in a system of accounts confined to actual receipts and payments are fundamental, and can be obviated only by recourse to a scheme of accounts based on income and expenditure. The latter system contains a record, so far as possible, of every step in a transaction as it takes place. It thus affords protection against negligence or irregularity, recording, as it does, all items payable or receivable by debits and credits which must remain on record until properly discharged. It ensures the presentation of the transactions of any given period completely and accurately, and is necessary for arriving at a correct statement of the financial position. A system restricted to actual cash received and paid has the merit of simplicity, but this advantage is obtained at the cost of completeness. Further, there is always the possibility under this system of deferring payments so as to exclude them from the accounts of the year to which they properly belong. It is submitted, therefore, that a system of income and expenditure on well-defined principles would furnish a stable and homogeneous basis for statistics; the statistical returns should follow the system of accounts and present a true and full statement of the financial position of the hospital.

The proper treatment of stores and materials forms another important question connected with the accounts of hospitals. It is essential that full and accurate stores accounts should be kept in all cases where materials are purchased for subsequent conversion or use, and the responsibility for them should be clearly confined. These accounts should form an integral part of the bookkeeping system, and should be so framed as to afford complete touch with the materials from their purchase to their consumption. These accounts should be supported by a proper system of stocktaking undertaken by or under the direct supervision of an independent stocktaker or an officer of the hospital who is not in any way responsible for the custody of the stores. The results of the stocktaking should be compared with the stores accounts and strict investigation made into any discrepancies. Where the operations of the hospital include the construction or carrying out of works by direct labour, it is essential that accurate cost accounts should be kept. Such accounts should show the materials used (in values and quantities) and the labour employed. We need not concern ourselves with the question of "on cost" or "overhead charges"; it is of minor importance in connexion with hospital accounts at present. The allocation of the labour charges will be based upon the wage payments, and the subsidiary documents from which the payments are made up. The proper allocation of these charges is a matter which requires careful and constant supervision. The differentiation of the duties of the executive officers and departments in such a way that the final results of the transactions of each may be checked by records of account kept independently of them is a principle strongly advocated. In the larger hospitals, no doubt, this is done to a certain extent. As regards the smaller hospitals the expense involved in the appointment of a separate accountant renders the full application of this principle impracticable. Much, however, may be done by a careful arrangement of the duties of the various officers.

In regard to the financial relations of the various departments of a large hospital and other kindred matters, many important questions arise which cannot be settled or controlled by general regulations. It is suggested, however, that all hospitals of sufficient size and importance should be required to appoint finance committees, with general powers of control, over all matters of finance and accounts. On the question of standardisation of hospital accounts and statistics general opinion is inclined to such standardisation, so far as it can be obtained, both as regards the system on which the accounts should be kept and as regards the form of their publication. With regard to the system of the accounts the writer is firmly convinced that general principles, such as have been laid down in this letter, should be clearly defined by regulation. But the details of the bookkeeping may need a certain amount of elasticity in order that they may be adapted to the diversities of local requirements; further, it is both unnecessary and impracticable to attempt to insist upon a stereotyped uniformity, provided the careful observance of the general principle is secured.

Uniformity in the published accounts can be largely obtained and is most desirable. The possibility of comparison, even if incomplete, tends to foster interest in the accounts and to stimulate criticism and investigation which may lead to substantial improvements in administration and secure economy with efficiency.—I am, Sir, yours faithfully,

J. E. STONE, F.S.A.A., F.R.S.S., F.R. Econ. S.,
Accountant, St. Thomas's Hospital, London.

Nov. 7th, 1922.

ACUTE SUFFOCATIVE ŒDEMA OF THE LUNG.

To the Editor of THE LANCET.

SIR,—Dr. de Havilland Hall, in your issue of Nov. 11th, called attention to the value of atropine in acute suffocative œdema of the lung. Within the last month I happen to have seen two cases of this somewhat rare condition, in which the effects of the hypodermic administration of atropine combined with adrenalin were almost miraculous.

The first case was that of a child of 11 admitted to St. Mary's Hospital on Oct. 9th with nephritis, albuminuria, and hæmaturia, but no dropsy. On Nov. 9th she became very dyspnœic, sitting up in bed and gasping for breath. She expectorated a pinkish watery fluid containing blood and some thin frothy mucus. There were coarse moist râles over the whole of the right lung, and some at the left base; 1/150 gr. of atropine and 3 minims of adrenalin chloride (1 in 1000) were administered hypodermically. This was soon followed by marked relief of symptoms. The injection was repeated in four hours, and the next morning she was comfortable and all the moist sounds had gone. On Nov. 13th there was a recurrence of the œdema of the lungs, which yielded to the same treatment. She is now making excellent progress, and has no symptoms, though there is still albuminuria.

The second case I saw on Nov. 9th in consultation with Dr. Keppel Barrett in Kensington. The patient was a man, aged 30, who had been taken ill the day before with shortness of breath. This had got steadily worse, and when I saw him there was orthopnœa, he was very distressed and appeared to be moribund, and was bringing up large quantities of thin, pink, frothy fluid. There were coarse bubbling râles over the whole of both lungs, back and front. The temperature was normal. There was no history of any previous illness. The urine contained albumin; 1/100 gr. of atropine and 10 minims of adrenalin chloride (1 in 1000) were administered subcutaneously. The relief was almost immediate. A further injection of 1/150 gr. of atropine and 5 minims of adrenalin was given in four hours' time. The next day he was quite comfortable and all the moist sounds had gone. I hear he is now getting on very well.

I have also notes of a case I saw in 1909. A woman, aged 30, was admitted to hospital for chronic nephritis. Two days after admission she had an attack of severe dyspnœa and coughed up large quantities of pinkish watery fluid. There were coarse bubbling râles over the left lung, most marked over the upper lobe. Temperature was normal. She was dry-cupped and bled, but this gave no relief, and she died with very distressing dyspnœa. Unfortunately, at that time I

had no knowledge of the value of atropine and adrenalin. Post mortem there was general œdema of the left lung; the kidneys were small and granular, weighing 2 oz. and 1¾ oz. respectively.

The result of treatment by atropine and adrenalin in this class of case is very striking. The atropine, doubtless, acts beneficially by diminishing or arresting the secretion from the bronchioles, but I attach considerable importance to the administration of adrenalin as well. Though the pulmonary vessels are not under the direct control of the vaso-motor system, the bronchial arteries, which are offshoots of the systemic circulation, presumably possess vaso-motor nerves like other systemic arteries. Dr. Brian Melland, in a paper in which he discusses the treatment of asthma by adrenalin (THE LANCET, 1910, vol. i., p. 1410), has called attention to this. Administration of adrenalin will stimulate the sympathetic and thus cause constriction of the bronchial arterioles, as of other systemic vessels. Its beneficial effects in this condition can therefore be readily understood.

The remarkable results of the administration of adrenalin and atropine would seem to indicate that the fluid is poured out mainly from the bronchioles rather than from the capillaries of the alveoli, on which presumably atropine and adrenalin exert no influence. I have always associated acute œdema of the lung with nephritis in some form, and I note that in the case described by Dr. W. J. Tyson in THE LANCET of Oct. 21st, albuminuria was present. His case he regards as an aborted pneumonia, but in my cases there was nothing to suggest this.

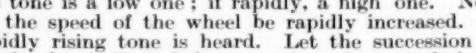
I am, Sir, yours faithfully,
JOHN F. H. BROADBENT.

Seymour-street, Nov. 13th, 1922.

MECHANISM OF THE COCHLEA.

To the Editor of THE LANCET.

SIR,—Mr. G. Wilkinson, in his letter in your issue of Oct. 21st, has not quite followed the problem that I have being trying to present. It can be stated as follows: If a card is held against the teeth of a revolving wheel (Savart's experiment), a tone is heard due to the series of air-shocks produced by the snapping of the card. If the shocks come slowly the tone is a low one; if rapidly, a high one. Now let the speed of the wheel be rapidly increased. A rapidly rising tone is heard. Let the succession of shocks be indicated by a series of upward jerks along a line as in the figure. The first shock



sets all the resonators in vibration. The second shock will oppose some of them—if they are still swinging at the time it comes—and favour others. The third shock will oppose and favour quite a different set; the fourth shock a still different one, and so on. Under the most favourable circumstances it takes at least three regularly repeated shocks to establish any resonance to the acting tone. Here there are no three shocks at the same interval apart. Yet the ear hears the rising tone.

The problem can be stated in still another way. Every resonator has its own period of free vibration. A blow to this resonator arouses its free vibration. Each succeeding blow likewise arouses its free vibration. If the blows in a series come at intervals agreeing with the period of free vibrations the free vibrations are summed up and the resonator responds loudly. If the interval does not agree, the free vibrations conflict and the resonator responds feebly or not at all. What is meant by the resonance theory of hearing is that to a tone or series of blows of a certain frequency that resonator will respond whose period of free vibration corresponds to the period of the tone, while the others will be silent. The unexplained fact that confronts the theory is that when a series of blows with rapidly changing interval strikes the ear the result is not heard as a noise but as a rapidly changing tone. No theory of the mechanism of the cochlea can maintain itself until it can explain this fact.

Just this peculiar condition is the most common one of all, because, as the records show, the series of puffs from the vocal cords are heard as the tone of the voice—and this tone is always rising and falling in speech. A pleasant "Good morning" is heard as a delightful rise and fall of beautiful tones; the resonance theory as at present stated would force it to be a continuous noise. With the analysis of vowel-waves according to the Fourier series this has nothing to do; any curve, regular or irregular, can be analysed in this way. In my work on the "Study of Speech Curves" Dr. Wilkinson will find many examples.

Dr. Hartridge's very clever apparatus was devised to show the validity of the resonance theory. It shows exactly the opposite. If Dr. Hartridge, instead of keeping the period of his motor regular, will speed it rapidly up and down all his pendulums will jerk about in hopeless confusion; there will be no resonance phenomena. Yet he will hear the buzzing of the motor as a clear tone that rises and falls. Mr. Wilkinson is quite right in saying that we should concentrate on the obvious. The most obvious fact of all is that the resonance theory of the cochlea cannot explain the simple fact above stated.

There is another fact overlooked by this theory. The fibres of the cochlea are heavily damped. The heavier the damping of a resonator the greater is the range over which vibrations can be forced on it. With such heavy damping practically all resonators must respond to practically all constantly maintained tones. I suggest to Dr. Hartridge that he replace the metal weights of his pendulums by visiting cards whose movements will be heavily damped by the air. Even with his motor at a constant speed I predict that all cards will move at all speeds.

I am, Sir, yours faithfully,
Welbeck-street, W. E. W. SCRIPTURE.

THE NORMAL INFANT'S CHEST.

To the Editor of THE LANCET.

SIR,—Dr. Stanley Melville's letter in your issue of Nov. 4th calls for some comment. We did not suggest that radiologists do not recognise the existence of shadows in the normal lung; but we have been unable to find in the literature any systematic description of the appearances of the chest of the healthy infant, and until the normal has been determined the loose writing to which he refers will inevitably continue.

His suggestion of bandaging the infant to a padded board is unfortunately impracticable. We fear that he has not quite realised the conditions under which such work must be done. We wish to induce mothers to bring their healthy babies to us for examination; any suggestion of the use of apparatus or bandaging would, we believe, quickly cut off our supply. Our procedure is to place the infant on its back upon the couch while its body and limbs are maintained in position by the mother and nurse. The tube is then centred with the greatest care at the level of the third costal cartilage. The wide variations in position and size of the heart shadow in our radiograms cannot be entirely due, as Dr. Melville appears to believe, to distortion from faulty position or inaccurate centring. Nor can they be due to movement during exposure, as is shown by the perfect definition in the original films.

In our earlier attempts, of which the reproductions in THE LANCET are examples, we gave insufficient attention to the position of the head, which, we believe, is of great importance. We hope to publish later results in which this defect is to some extent corrected, but for perfect accuracy a fixing apparatus would be required which would immobilise not only the trunk but also the head and neck.

We are, Sir, yours faithfully,
J. HUNTER P. PATON,
A. ROWAND.

St. Andrews Institute for Clinical Research, Fife, Nov. 7th.

NOTIFICATION OF JUVENILE SUFFERERS FROM VENEREAL DISEASE.

To the Editor of THE LANCET.

SIR,—The entire lack of provision for the treatment of venereal disease occurring amongst natives in Durban has rendered it necessary to return them to their kraals, often in a highly infectious condition. It is probable that a large number of these recover without treatment of any kind, but there is always the danger that they may be instrumental in the spread of venereal diseases in outlying districts, especially when the obvious signs of their condition become less evident to themselves and their friends. Although this danger has been recognised by the Government, no suitable provision has so far been made, and the problem was aggravated when, in December, 1921, the Government hospital refused to treat any cases of venereal disease occurring amongst even Europeans who were resident in the borough. The matter has recently been taken up by the Juvenile Affairs Department who approached the Minister for Public Health, urging that facilities for early treatment should be afforded to all sufferers in the interests of juveniles, and, further, that venereal disease occurring amongst juveniles up to the age of 18 years should be notifiable to the medical officer of health for the borough. Although due consideration had been given to the reasons that had been advanced against the notification of venereal disease occurring amongst adults, it was felt that juveniles were unlikely to realise the seriousness of the disease so far as they were concerned, and that, in the interests of the young patient, his relations, and those who occupied the same dwelling-house, the necessary treatment should be undertaken in a suitable ward at the earliest possible moment after the condition had been diagnosed. This step may well meet with the approval of others who are interested in this aspect of disease prevention.—I am, Sir, yours faithfully,

F. G. CAWSTON, M.D. Camb.

Durban, Oct. 24th, 1922.

GASTRO-ENTEROSTOMY CLAMPS.

To the Editor of THE LANCET.

SIR,—Surgeons who use clamps in gastro-enterostomy will be interested in the suggested improvement in their design described by Mr. Norman M. Dott in your issue of Sept. 23rd. In a well-illustrated paper, which appeared in *Surgery, Gynecology, and Obstetrics*, August, 1916, vol. xxiii., p. 225, Dr. Joseph Eastman described a clamp on exactly the same principle under the title of "An Uncomplicated and Convenient Intestinal Anastomosis Clamp." In Mr. Dott's design, no doubt arrived at independently, the absence of the short handle, the separation of each element, and the bullet-shaped nut instead of a heart-shaped nut, appear to be improvements on Dr. Eastman's clamp.

I am, Sir, yours faithfully,

IAN MACDONALD, M.D.

Huelva, Spain, Nov. 10th, 1922.

NIGHT SWEATS.

To the Editor of THE LANCET.

SIR,—My friend, Dr. F. R. Walters, in his letter to THE LANCET of August 12th suggests that I was ambiguous as to the use of slumber mats. I think my reference to the "Shibboleths of Tuberculosis" made it quite plain that I only recommended these mats after hygienic means had failed to prevent the sweats; he also suggests that my experience is abnormal. He goes on to say that "one ought to regard 'night' sweats as presumptive evidence of insufficient ventilation or other hygienic blunder." As I had distinctly stated we had severe night sweats here, there would be no ambiguity in my taking this statement as a very severe reflection on the administration of Colindale. I think, however, each of his points is answered by the following letter published in the *British Medical Journal* of Oct. 21st last (p. 780):—

> "Irishman" asks for advice in the treatment of very profuse sweating in a case of pulmonary tuberculosis; the patient is 32; the area of lung involved is quite moderate, as also are the evening temperature and the amount of sputum; the hygienic conditions are superb and two nurses are in attendance; the routine remedies are futile. . . . .

Here is the early case—to which type I referred—sweating in spite of the best possible conditions and therefore eminently suitable for a slumber mat.

I am, Sir, yours faithfully,

MARCUS PATERSON.

Colindale Hospital, Hendon, Nov. 13th, 1922.

AUENBRUGGER'S BICENTENARY.

To the Editor of THE LANCET.

SIR,—I think that it has escaped general attention that this year marks the bicentenary of the birth of the discoverer of the first important step in the clinical examination of the chest—namely, the method of percussion. This advance was made by Auenbrugger. The following extract from my grandfather's (Dr. Thomas Davies) lectures on "The Diseases of the Lungs and Heart," delivered at the London Hospital, and published in the *Medical Gazette* in 1835, states "that Leopold Auenbrugger was born at Graets in Styria in 1722—he became physician to the Imperial Hospital of the Spanish Nation at Vienna. There it was that he prosecuted, as he expressed it, his studies *inter taedia et labores* on the subject for a period of seven years, and in the year 1763 he published a work which he called 'Inventum Novum ex Percussione Thoracis humani ut signo, abtrusis interni pectoris morbo detegendi.' No notice was taken of his book until 1770, when Rozière de la Chassaque, of Montpellier, translated it, avowing he knew nothing of the subject practically, and the inference he would lead you to draw is that he did not think much of the discovery himself.

"The pamphlet seemed now consigned to oblivion. However, Stoll, Van Swieten, and Cullen in his 'First Lines' make some mention of it, but declared they knew nothing of it practically. Corvisart, when preparing his celebrated clinical lectures, first met with the subject on reading Stoll's work. He immediately commenced a series of experiments, which he continued for 20 years, and in 1808 published a new translation of Auenbrugger with his own commentaries, a work that has been translated into every European language."

It seems to me to be fitting and worthy of interest to recall these historic facts.

I am, Sir, yours faithfully,

ARTHUR T. DAVIES, M.D., F.R.C.P.

Tokenhouse Yard, E.C., Nov 11th, 1922.

THE MENSTRUAL CYCLE AND CALCIUM CONTENT OF THE BLOOD.

To the Editor of THE LANCET.

SIR,—Miss Widdows, B.Sc., in THE LANCET of Nov. 11th, p. 1037, states that the increase in the calcium content of the blood during menstruation "might be expected." Why during? Is it not more reasonably expected just antecedent to the period? May I also ask why Miss Widdows chooses the time midway to contrast with the menstrual time? Is she not aware of what is called on the Continent the Mittelschmerz? By choosing the time midway between the periods to contrast with the periods she chooses the one time in the cycle which is not a contrast, but is comparable. A realisation of the significance of the chart published some years ago in "Married Love" would have saved this confusion.

I am, Sir, yours faithfully,

MARIE C. STOPES.

Leatherhead, Surrey, Nov. 13th, 1922.

THE DIFFERENTIAL DIAGNOSIS OF SMALL-POX AND CHICKEN-POX.

To the Editor of THE LANCET.

SIR,—While I am in agreement with Dr. Sidney F. Fouracre's observations in his letter in your issue of Nov. 4th that there is value in the two signs of small-pox mentioned—namely, the vomiting in the stage of onset and the fall in the temperature on the appearance of the rash—the purpose of my letter in THE LANCET of Oct. 21st was to emphasise the four points which in the actual revision of some 11,000 cases had proved to be of the most practical value to me in revising those cases.

It is true that vomiting is a point in favour of small-pox, but small-pox occurs in this country in persons who have not vomited. The main thing, however, is that for one reason or another it is a point not always easy to establish, and this remark applies still more to the fall of the temperature at the appearance of the rash. In the majority of the cases which I have seen there has been no chance whatever of establishing this point. On the other hand, the four points I mentioned can almost always be established—namely, whether there has or has not been prostration, the relative density of the eruption, the relative depth of the lesions, and whether and how much the rash develops from day to day. These points have not only the value of commonly being available, but also of being among the most cogent evidence of all. That is why I mentioned them in my previous letter, and now again commend them to my colleagues.

I am, Sir, yours faithfully,

London, S.E., Nov. 14th, 1922. W. McC. WANKLYN.

THE ACTION OF VACCINES.

To the Editor of THE LANCET.

SIR,—In THE LANCET of Oct. 14th I took exception to Dr. Pratt-Johnson's statement that my detoxication process weakened the antigenic properties of vaccines at least one hundred times. Dr. Pratt-Johnson in his letter of Nov. 4th now admits that this is merely his own opinion, and he does not give the scientific data (for which I asked) upon which he bases his belief. He evades my question and seeks to defend himself by asking a counter question—viz. :—

"Will Dr. Thomson state if he is able to furnish conclusive data of animal protection experiments with vaccine before and after treatment, in refutation of the statements that his detoxication process enormously weakens the antigenic value of vaccine?"

Dr. Pratt-Johnson claims to have read my researches, and if he will take the trouble to read them again more carefully he will find the information for which he asks. I will summarise my data briefly as follows :—

1. Immunity tests were carried out in four parallel series of cases: (*a*) received no vaccine; (*b*) received small doses of gonococcal vaccine before detoxication; (*c*) received larger doses of gonococcal vaccine before detoxication; (*d*) received large doses of gonococcal vaccine after detoxication. These four series comprised at least 200 cases and showed clearly by immunity tests and by careful clinical observation by an independent observer that the detoxicated vaccine was much superior to the ordinary vaccine. The animals tested in this research were human beings, which give quite as reliable information as is obtainable from rats, mice, guinea-pigs, &c., vide, Thomson and Lees (1919).[1] Further confirmation of this work has been published by Corbett and Osmond (1920),[2] by Fraser and Duncan (1920),[3] by Lees (1921),[4] by Jenkins, Heywood, and others (1921).[5]

2. Animal experiments which Dr. Pratt-Johnson calls for will be found in Vaughan's work, "Protein Split Products" (1913), Lea and Febiger.

3. I gave details of careful experiments which proved that large doses of antigen were better than small doses in producing the formation of anti-substances—vide, Thomson, D. and R. (1922),[6] and, further, I would call Dr. Pratt-Johnson's attention to the work of Balls and Korns (1918),[7] who showed that when red cells were treated with alkalis and acids in a manner very similar to my detoxication process their antigenic properties were not injured.

I do not wish to trespass further on your valuable space, but would like to mention that I have experimented much and read very widely on this matter, and have an enormous mass of evidence at hand. All this evidence is based on experimental work by myself and others, whereas Dr. Pratt-Johnson's statements are apparently mere opinions.

I am, Sir, yours faithfully,

DAVID THOMSON.

Harley-street, London, W., Nov. 13th, 1922.

[1] THE LANCET, June 28th. [2] Ibid., vol. ii., p. 346.
[3] Ibid., Nov. 13th. [4] Brit. Med. Jour., June and Sept. 24th.
[5] Brit. Med. Jour., June 11th, p. 846.
[6] Ibid., May 20th, p. 796.
[7] Jour. of Immunology, Baltimore, vol. iii., p. 375.

Medical News.

UNIVERSITY OF OXFORD.—The trustees of the late Sir William Dunn have made an offer of £100,000 for the establishment of a School of Pathology to be known by his name, on condition that a suitable site is provided by the University, which must also make itself responsible permanently for financing a chair in pathology and a full teaching staff. A further sum of £3000 is offered for the conversion of the present pathological department into a school of pharmacology.

UNIVERSITY OF GLASGOW.—The following degrees were conferred on Nov. 11th :—

M.D. (with commendation).—John Stewart, M.B., Ch.B., D.P.H. Thesis: A Clinical Study of the Action of Diphtheria Toxin in Relation to Paralytic Phenomena.

M.B., Ch.B.—William Morison and George Jackson Muller.

UNIVERSITY OF DUBLIN, SCHOOL OF PHYSIC, TRINITY COLLEGE.—At examinations held recently the following candidates were successful :—

FINAL MEDICAL EXAMINATION.

Part I., Materia Medica and Therapeutics; Medical Jurisprudence and Hygiene; Pathology and Bacteriology.—*Robert F. J. Henry, *Lewis C. Brough, *John R. Bradshaw, and *Maynard A. Gerrard (equal), Gerrard A. Sloan, Alan J. Mooney, John McClelland, and Evaline Elizabeth Mooney (equal), Simon Wigoder, Desmond K. Lyons, Lucy M. Joly, Wentworth A. Taylor, Roy K. Carson, and Richard L. G. Proctor (equal), Henry Isaacson, Samuel E. Magowan, Francis V. Duke, and Isaac J. Isaacson (equal), Dorothy J. Booth, Philip B. Robinson, and Leslie M. Whitsitt (equal), James S. Armstrong, Louis M. Bell, Solomon Narunsky, William A. Redmond, Philip P. Van der Merwe, John E. Stokes, Lucy E. R. Pigott, and Herbert W. Strong.

Materia Medica and Therapeutics; Medical Jurisprudence and Hygiene (in completion).—William L. W. Smith.

Pathology and Bacteriology (in completion).—Samuel McDermott, Gladys Weatherill, and Angel Valentine B. Crawford.

Materia Medica and Therapeutics; Medical Jurisprudence and Hygiene only.—John E. Beatty, John L. Levingston, Christopher Lord-Flood, James Craig, and Pieter Coetzee de Plessis.

Materia Medica and Therapeutics; Pathology and Bacteriology only.—James L. Marshall and Alexander Hawthorne.

Medical Jurisprudence and Hygiene; Pathology and Bacteriology only.—Paul Douglas Piel.

Medical Jurisprudence and Hygiene only.—Herbert Birney.

* Passed on high marks.

DIPLOMA IN GYNÆCOLOGY AND OBSTETRICS.

Hubert Sydney Jacobs.

UNIVERSITY OF SHEFFIELD.—The Council of the University at its last meeting made the following appointments: Mr. G. H. Froggatt, L.D.S. Eng., to a lectureship in dental surgery; and Mr. C. T. Watson, L.D.S. Eng., to the post of lecturer in orthodontics.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—An ordinary Council meeting was held on Nov. 9th, Sir Anthony Bowlby, the President, being in the chair.

On the election of Members of 20 years' standing to the Fellowship, under Section 5 of the Charter of 15th of Victoria, Dr. Wilfred Thomason Grenfell was introduced, and after signing the By-laws and making the required declaration was admitted a Fellow of the College. A report was read from the Court of Examiners respecting candidates found

qualified for the diploma of Member, and diplomas were granted to 128 candidates mentioned in the report. A report was read from the Committee of Management, and it was agreed that the Proposed Regulations for the Preliminary Examination in General Education and for the Pre-medical Examination in Chemistry and Physics, together with the revised synopses of Chemistry and Physics, be approved and adopted. The proposed Regulations for the Conjoint Diploma were likewise agreed and adopted, to come into force after Jan. 1st, 1923. Sir Charles Ballance was re-elected a Member of the Committee of Management. The thanks of the Council were given to Sir J. Herbert Parsons for his services as the representative of the College on the Departmental Committee of the Ministry of Health on the Causes and Prevention of Blindness. The President reported that the Bradshaw Lecture on the Surgery of the Spinal Cord would be delivered by Sir William Thorburn on Friday, Dec. 8th, at 5 P.M., and that the Thomas Vicary Lecture on Vesalius and his Delineation of the Framework of the Human Body would be delivered by Mr. W. G. Spencer on Thursday, Dec. 14th, at 5 P.M. The President announced the appointment of Mr. K. N. G. Bailey as the second Streatfeild Research Scholar, the subject of the research being Infection of the Urinary Tract by Coliform Bacilli to be carried out at St. Bartholomew's Hospital. The President reported that he had appointed Sir John Lynn-Thomas as a member of the Advisory Board of Medicine of the University of Wales.

UNIVERSITY OF LONDON: UNIVERSITY COLLEGE.—Dr. Henry Kenwood, Chadwick professor of hygiene and public health, will deliver a public lecture on the Pasteurisation of the Public Milk Supply at University College on Thursday, Nov. 23rd, at 5 P.M. The chair will be taken by Sir William Collins. Tickets of admission are not required.

LONDON DERMATOLOGICAL SOCIETY.—A meeting of this society will be held at 4.30 P.M. on Nov. 21st at St. John's Hospital, 49, Leicester-square, London, W.C. At 5.15 Dr. A. Knyvett Gordon will open a discussion on Vaccine Therapy in Dermatology.

MEDICAL OFFICERS OF SCHOOLS ASSOCIATION.—The annual general meeting of this Association will be held at 11, Chandos-street, Cavendish-square, London, W., on Nov. 24th, at 5 P.M., when Dr. A. R. Friel will read a paper on the Ionisation Treatment of Otorrhœa with demonstration of apparatus. The paper will be followed by a discussion.

THE Honours List of the late Government contains the name of Dr. Harvey Hilliard, anæsthetist to the Royal Dental Hospital, London, who originated the Empire Hospital for Paying Patients. He has been made a Commander of the Civil Division of the Order of the British Empire.

MEMORIAL FUND TO THE LATE SIR CHARLES RYALL. The Cancer Hospital, Fulham-road, London, has opened a fund at Coutts's Bank in memory of the late Sir Charles Ryall. Subject to the necessary funds being forthcoming, it is proposed that the memorial shall take the form of a new operating theatre unit.

GIFT TO READING BY DR. J. B. HURRY.—On the occasion of the recent election of Alderman Cox as Mayor for Reading, Dr. J. B. Hurry presented the corporation of the town with Mr. Stephen Reid's Royal Academy picture representing the election of Thomas Clerke as Mayor of Reading in 1460.

ROYAL WATERLOO HOSPITAL.—An amateur dramatic performance in aid of the endowment fund of the late Duchess of Albany's Children's Ward will be held at the theatre of the Royal Academy of Dramatic Art, Malet-street, Gower-street, London, W.C., to-day, Friday, at 8.15 P.M. Tickets at 1 guinea, 10s. 6d., and 5s. may be obtained from Mrs. S. L. Lazarus, 6, Balfour-place, London, W. 1.

AUXILIARY R.A.M.C. FUNDS.—At the usual quarterly committee meeting recently held grants were made to cases in the Benevolent Branch for the orphans of officers, amounting to £111, and grants in the Relief Branch for the widows and children of the rank and file, amounting to £1301. Requests for relief should be addressed to the hon. secretary, at the offices of the Funds, 11, Chandos-street, London, W. 1.

SMALL-POX AND MEASLES IN LANCASHIRE.—A case of small-pox was reported in the Springfield district of Rawtenstall, Lancashire, last week. The patient has been taken to the isolation hospital. The epidemic of measles in Manchester which began early in the summer is still in progress; during the last five or six weeks the number of new cases has averaged 200. In the week ended Nov. 4th, there were 247 new cases and three deaths, as against 244 in the preceding week, and only 10 in the corresponding week of last year.

MEDICO-LEGAL SOCIETY.—A meeting of this Society will be held at 11, Chandos-street, Cavendish-square, London, W., on Nov. 21st, at 8.30 P.M., when a paper will be read by Earl Russell on the Ethics of Suicide.

ROYAL SANITARY INSTITUTE.—On Nov. 21st, at 4 P.M., Lieut.-Colonel W. Wesley Clemesha will lecture at 90, Buckingham Palace-road, London, on Water and Water-Borne Diseases, Sir R. Havelock Charles presiding.

LUNCHEON TO DR. MICHAEL COX.—On Nov. 11th his colleagues on the staff of St. Vincent's Hospital, Dublin, entertained Dr. Michael F. Cox to luncheon at the Shelbourne Hotel, Dublin, in recognition of his recent election as President of the Royal College of Physicians of Ireland. Mr. J. S. McArdle, who presided, proposed the toast of the guest, and also, on behalf of the staff of St. Vincent's, presented Dr. Cox with a silver cup on the model of the Ardagh chalice. Among the other guests present were Mr. John Dillon, a former fellow student with Dr. Cox, and the Recorder of Dublin.

CHELSEA CLINIC OF AUTO-SUGGESTION.—This clinic was opened at 268, King's-road, London, S.W., in October, 1921, and is in charge of Dr. M. F. Monier-Williams and Dr. Charles Harford, who are testing the treatment of disease of organic as well as of functional origin by the method of collective auto-suggestion, as initiated by M. Coué, of Nancy, and expanded by Prof. Baudouin, of the Geneva School of Psychology. The clinic is entirely free, and is intended for patients unable to afford ordinary professional fees. Medical men are invited to send any cases they consider suitable. Women are seen on Wednesdays at 5.15 P.M., and men on Fridays at 5.15 P.M.

THE LATE DR. J. O. LITTLEWOOD.—The death occurred on Nov. 8th of Dr. John Oscroft Littlewood, aged 67, who was educated at the Medical School of Guy's Hospital, and became a well-known Nottingham practitioner. Qualifying with the M.R.C.S. Eng. in 1882 he obtained the L.R.C.P. Lond. and the L.S.A. in the following year, and was for a time clinical assistant at the Seamen's Hospital, Greenwich, and also at the London Fever Hospital. Dr. Littlewood had held the posts of medical officer of health to the Blackwall and Skegby Rural District Councils, school medical officer to the Blackwall District, and hon. surgeon to the Mansfield District Accident Hospital. He was a Fellow of the Society of Medical Officers of Health.

ST. THOMAS'S HOSPITAL: OLD STUDENTS' DINNER.—This annual dinner was held on Nov. 10th at Princes' Restaurant, Piccadilly, under the chairmanship of Sir Charles Sherrington, P.R.S., and was the opportunity for a reunion of over 200 old Thomas's men, including Dr. J. Evan Jones, who entered the hospital in 1855. In replying to the toast of St. Thomas's Hospital and Medical School, proposed by the Chairman, Sir Cuthbert Wallace referred to the policy of the medical school in restricting the number of students admitted to the hospital in order to secure an adequate training for every student. The hospital's finances were much improved, although it was not yet able to keep its expenditure within the limits of its income. The health of the chairman was proposed by Sir Charles Ballance, who pointed out Sir Charles Sherrington's early and fruitful association with Pasteur, Lister, and Michael Foster; no less than 150 papers of incalculable value had come from his pen. Amongst those present were Sir Anthony Bowlby, Dr. C. R. Box, Sir R. Charles, Sir Walter Fletcher, Dr. H. P. Hawkins, Sir F. S. Hewett, Sir Robert Hill, Mr. W. Hill, Dr. H. W. G. Mackenzie, Prof. H. MacLean, Sir James Magill, Sir George H. Makins, Major-General S. Guise-Moores, Sir George Newman, Sir A. Newsholme, Mr. C. Max Page, Prof. F. G. Parsons, Mr. A. Maitland Ramsey, Sir A. Reid, Mr. Percy Sargent, Sir S. Sharkey, Dr. R. Percy Smith, Sir William Thorburn, and Dr. H. G. Turney.

Appointments.

CHANDLER, F. G., M.D. Camb., M.R.C.P. Lond., has been appointed Assistant Physician to Charing Cross Hospital.

HENDERSON, A. M. (Miss), M.B., B.S. Lond., Resident Medical Officer at the Haywood Hospital, Burslem.

SURRAGE, H. J., M.R.C.S. Eng., L.R.C.P. Lond., Anæsthetist at the Chelsea Hospital for Women.

Certifying Surgeons under the Factory and Workshop Acts: ROBERTSON, J. B., M.B., C.M. Glasg. (Dawley); MORRIS, J. M., M.B., C.M., D.P.H. Edin. (Neath); DANAHER, H. W. B., L.R.C.P. Lond., M.R.C.S. (Rainham).

Vacancies.

For further information refer to the advertisement columns.

Cairo School of Medicine, Egypt.—Radiologist &c. L.E.480.
Cardiff, King Edward VII. Hospital.—Two H.S.'s. Each £150. Also Hon. M.O. to Physiotherapy Dept.
Cavan County Hospital.—S. £500.
Doncaster Royal Infirmary and Dispensary.—Sen. and Jun. H.S.'s. £220 and £175 respectively.
Dreadnought Hospital, Greenwich, S.E.—H.S. £150.
Elizabeth Garrett Anderson Hospital, Euston-road, N.W.—H.P., Obstet. Asst., and Two H.S.'s. Each £50.
Glasgow, Hawkhead Asylum, Cardonald.—Jun. Asst. M.O. £275.
Grimsby and District Hospital.—H.S. £300.
Herefordshire General Hospital.—Hon. S.
Hospital for Sick Children, Great Ormond-street, W.C.—H.S. £50.
Huddersfield.—School Med. Inspector. £500.
Ipswich, East Suffolk and Ipswich Hospital.—Hon. Anæsthetist.
Isle of Man Central Education Authority.—School M.O. £700.
King Edward VII. Sanatorium, Midhurst, Sussex.—Second Asst. M.O. £250.
Leamington Spa, Warneford, Leamington, &c., General Hospital.—Res. H.S. £150.
London Lock Hospital, 91, Dean-street, W.—Clin. Assts.
Manchester, Ancoats Hospital.—Hon. Surg.
Manchester Royal Infirmary.—Asst. M.O. £35. Anæsth. £50.
Manchester, St. Mary's Hospitals for Women and Children.—H.S.'s. £100.
Manchester University.—Asst. Lecturer in Bact. £500. Demonstrator in Bact. £400.
Maudsley Hospital, Denmark Hill, S.E.—Two Asst. M.O.'s. £514 and £449.
Mildmay Mission Hospital, Austin-street, Bethnal Green, E.—Sen. Res. M.O. £140. Jun. Res. M.O. £100.
Newport, Mon., Royal Gwent Hospital.—H.S. £200.
North Shields, Tynemouth Union Poor-Law Institution, Preston-road.—Asst. M.O. £300.
Nottingham Children's Hospital.—Res. H.P. £160.
Pietermaritzburg, S. Africa, Grey's Hospital.—H.S. £400.
Prince of Wales's General Hospital, Tottenham, N.—Hon. Asst. P. Hon. Anæsth. £20.
Queen Mary's Hospital for the East End, Stratford, E.—H.P. £150.
Queen's Hospital for Children, Hackney-road, Bethnal Green, E.—Asst. P. £25.
Royal Free Hospital, Gray's Inn-road, W.C.—H.P., H.S.'s., &c., also H.S. (M.M.S.) and Obstet. Asst. Each £50. Gynæcological Reg. £250
Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—H.S. £100. Also Hon. Phys. for Out-patients.
Royal Westminster Ophthalmic Hospital, King William-street, West Strand, W.C.—Asst. S.
Samaritan Free Hospital for Women, Marylebone-road, N.W.—Surg. Reg. £50.
Sheffield, Jessop Hospital for Women.—Asst. H.S.'s. £100.
University College Hospital, Gower-street, W.C.—M.O. £300.
West End Hospital for Nervous Diseases, Welbeck-street, W.—Pathologist.
West London Hospital, Hammersmith-road, W.—H.P., H.S., Aural H.S., and Res. Cas. O. Each £100.
Wrexham Infirmary.—H.S. £150.

The Chief Inspector of Factories, Home Office, London, S.W., announces the following vacant appointment: Mansfield (Nottingham).

Births, Marriages, and Deaths.

BIRTHS.

CHURCHILL.—On Nov. 8th, at Royal Arsenal, Woolwich, the wife of Major Brooke Churchill, R.A.M.C., of a daughter.
CLAPHAM.—On Nov. 4th, at Madeley House, Park-road, Peterborough, the wife of Harold Clapham, M.R.C.S., L.R.C.P., of a daughter.
EARP.—At Johns Hopkins Hospital, Baltimore, Maryland, U.S.A., to Kathleen May (née Goodliffe) and J. Rosslyn Earp, M.A., M.R.C.S.—a son, who was named David.
NEELY.—On Nov. 12th, at Vernon House, Lee-road, Blackheath, the wife of Dr. Guy Neely, of a daughter.

DEATHS.

BIGGS.—On Nov. 10th, Lieut-Colonel G. Nixon Biggs, M.B., B.S., aged 41 years.
BRUNT.—On Oct. 29th, at Moorland House, Leek, Staffs, Major E. H. Brunt, M.B., R.A.M.C.(T.F.).
CUTHBERT.—On Nov. 6th, at Craigeach, Pitlochry, Captain Henry Pierce Cuthbert, R.A.M.C., retired.
DUTCH.—On Nov. 10th, at Brighton, Myer Akiba Dutch, M.D., F.R.C.S., D.P.H. Camb.
MILNE.—On Nov. 8th, Robert Milne, M.D., of Windsor-road, Forest Gate, medical officer of Dr. Barnardo's Homes.
MORSE.—On Nov. 9th, Edward Morse, L.R.C.P., L.R.C.S., of Great Torrington, Devon, aged 65 years.
PACKER.—On Oct. 26th, at Cologne, the result of an accident, Captain Norman Edward Packer, R.A.M.C.
SIBLEY.—On Nov. 11th, at Tunbridge Wells, Clara Fanny, age 87, widow of Septimus W. Sibley, F.R.C.S., late of 7, Harley-street and Whitehill, Blatchingley, last surviving daughter of the late Sir Robert Walter Carden, Bart., M.P.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Tuesday, Nov. 21st.

GENERAL MEETING OF FELLOWS: at 5 P.M.
Ballot for Election to the Fellowship.

PATHOLOGY: at 8.30 P.M.
Communications:
Dr. O. L. V. de Wesselow: The Calcium and Phosphorus of the Blood in Nephritis.
Dr. C. E. Dukes: A New Fermentation Tube.
Dr. J. C. G. Ledingham: Some Notes on Tularæmia: Histology and Diagnosis.
Dr. J. C. Mottram: Some Effects of Exposure to Radium on the Blood Platelets.
Dr. A. J. Eagleton, Dr. C. C. Okell, Miss E. M. Baxter: The Serological Classification of *B. diphtheriæ*.

Wednesday, Nov. 22nd.

OCCASIONAL LECTURE: at 5 P.M.
Prof. H. C. Jacobæus (Stockholm): The Practical Importance of Thoracoscopy, especially in the Pneumothorax Treatment of Pulmonary Tuberculosis.

Friday, Nov. 24th.

STUDY OF DISEASE IN CHILDREN: at 5 P.M. (Cases at 4.30 P.M.)
Cases will be shown by:—
Dr. Bernard Myers, Dr. Forest Smith, Dr. G. M. Kendall, and others.

EPIDEMIOLOGY AND STATE MEDICINE: at 8 P.M.
Papers:
Dr. F. M. Turner: A Statistical Study of the Age-incidence of Scarlet Fever.
Dr. John Brownlee: A Note on the Relation between Rainfall and Scarlet Fever.

HUNTERIAN SOCIETY.
MONDAY, Nov. 20th.—9 P.M. (at the Cutlers' Hall, Warwick-lane, Newgate-street, E.C.), Dr. Porter Phillips: The Position of Insanity in Criminal Law.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE POST-GRADUATE LECTURES, 1, Wimpole-street, W.
WEDNESDAY, Nov. 22nd.—5 P.M., Dr. S. A. K. Wilson: The Old Motor System and the New.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.
MONDAY, Nov. 20th.—10.30 A.M., Mr. Maingot: Surgical Pathology. 12.15 P.M., Dr. Burnford: Pathological Demonstration. 4.30 P.M., Mr. Bishop Harman: Pink Eye.
TUESDAY.—10 A.M., Dr. Paterson: Demonstration of Medical Cases. 12 noon, Mr. Sinclair: Surgical Diseases of Abdomen. 4.30 P.M., Mr. Banks-Davis: Clinical Lecture.
WEDNESDAY.—10 A.M., Dr. Saunders: Medical Diseases of Children. 12 noon, Mr. Simmonds: Demonstration of Fractures. 4.30 P.M., Mr. Donald Armour: Surgery of the Pancreas.
THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Department. 12 noon, Dr. Scott Pinchin: Disease of the Heart. 4.30 P.M., Sir Humphry Rolleston: Blood Pressure.
FRIDAY.—11 A.M., Dr. McDougal: Electrical Department. 12.15 P.M., Dr. Burnford: Applied Pathology. 4.30 P.M. Mr. Banks-Davis: Clinical Lecture.
SATURDAY.—9 A.M., Dr. Burnford: Bacterial Therapy. 10 A.M., Dr. Saunders: Medical Diseases of Children. 10 A.M., Mr. Simmonds: Orthopædics.
Daily, 10 A.M. to 6 P.M., Saturdays, 10 A.M. to 1 P.M.: In-patients, Out-patients, Operations, Special Departments.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, Balham.
WEDNESDAY, Nov. 22nd.—4 P.M., Dr. E. A. Peters: Newer Methods of Examination in Conditions of the Trachea and Œsophagus.

NATIONAL HOSPITAL FOR DISEASES OF THE HEART, POST-GRADUATE COURSE, Westmoreland-street, W.
MONDAY, Nov. 20th.—10 A.M., Out-patients: Dr. J. Strickland Goodall. 5.30 P.M., Dr. John Parkinson: Mitral Regurgitation.
TUESDAY.—10 A.M., Ward Demonstration: Dr. B. T. Parsons-Smith. 2 P.M., Out-patients: Sir S. Russell-Wells.
WEDNESDAY.—10 A.M., Out-Patients: Dr. John Parkinson. 2 P.M., Out-patients: Dr. R. O. Moon.

THURSDAY.—2 P.M., Out-patients: Dr. F. W. Price.
FRIDAY.—10 A.M., Out-patients: Dr. B. T. Parsons-Smith. 2 P.M., Out-patients: Dr. John Parkinson. 4.30 P.M., Ward Demonstration: Dr. J. Strickland Goodall.
SATURDAY.—10 A.M., Ward Demonstration: Dr. P. Hamill,

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, Queen-square, Bloomsbury, W.C. 1.
POST-GRADUATE COURSE: OCT.–DEC., 1922.
CLINICAL LECTURES AND DEMONSTRATIONS.
MONDAY, Nov. 20th.—2 P.M., Out-patient Clinic: Dr. Hinds Howell. 3.30 P.M., Lecture:—Disorders of Muscle Tone in Nervous Diseases: Dr. Walshe.
TUESDAY, Nov. 21st.—2 P.M., Out-patient Clinic: Dr. Grainger Stewart. 3.30 P.M., Lecture:—Muscular Atrophy: Dr. Adie.
THURSDAY, Nov. 23rd.—2 P.M., Out-patient Clinic: Dr. Kinnier Wilson. 3.30 P.M., Demonstration of Physical Exercises.
FRIDAY, Nov. 24th.—2 P.M., Out-patient Clinic: Dr. Gordon Holmes. 3.30 P.M., Lecture:—Cerebral Tumours from the Surgical Aspect: Mr. Sargent.
Mr. Armour and Mr. Sargent operate at the Hospital on Tuesday and Friday mornings at 9 A.M., or at such other times as may be announced.
Lecture on NEURO-OPHTHALMOLOGY (in the Lecture Theatre). WEDNESDAY, Nov. 22nd.—3.30 P.M., Ocular Palsies: Mr. Leslie Paton.
N.B.—Not more than fourteen candidates can attend this Course.
Lectures on NEURO-PATHOLOGY. MONDAY, Nov. 20th.—12 noon, Disseminated Sclerosis and Subacute Combined Degeneration. THURSDAY, Nov. 23rd.—12 noon, The Pathology of Cerebral and Spinal Tumours: Dr. J. Godwin Greenfield.
The fee for the whole Course, including Mr. Paton's lectures, is £14 14s., but these Lectures may be taken separately for a fee of £6 6s. Any part of the Course may be taken separately at a special fee. Special arrangements will be made for those unable to take the whole Course. Fees should be paid to the Secretary of the Hospital at the office on entering for the Course.
C. M. HINDS HOWELL, Dean of Medical School.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY, Nov. 23RD.—4 P.M., Dr. D. Paterson: Tuberculous Meningitis.

ST. JOHN'S HOSPITAL, 49, Leicester-square, W.C.
THURSDAY, Nov. 23rd.—5 P.M., Dr. W. Griffith: Common Forms of Dermatitis.

UNIVERSITY OF SHEFFIELD—FACULTY OF MEDICINE
Post-Graduate Lectures and Demonstrations.
TUESDAY, Nov. 21st.—3 P.M. (at the Royal Infirmary), Dr. Yates: Serous Meningitis. 4 P.M., Mr. Finch: Treatment of Prostatic Obstructions.
FRIDAY.—3 P.M. (at the Royal Hospital), Dr. Mould: Treatment of Insanity. 4 P.M., Mr. F. Wilson: Carcinoma of the Stomach.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE CLINIC.
TUESDAY, Nov. 21st.—4.15 P.M., Dr. E. D. Telford: Some *Bacillus coli* Infections.

MANCHESTER FRENCH HOSPITAL, 24, Acomb-street, Whitworth Park.
THURSDAY, Nov. 23rd.—4.30 P.M., Dr. A. C. Magian: Appendicitis in Women.

SALFORD ROYAL HOSPITAL POST-GRADUATE LECTURES.
THURSDAY, Nov. 23rd.—4.30 P.M., Dr. Clifford: Some Causes of Post-partum Pyrexia.

ROYAL INSTITUTE OF PUBLIC HEALTH, 37, Russell-square, W.C.
WEDNESDAY, Nov. 22nd.—4 P.M., Dr. H. Scurfield: The Milk Problem, including the Use of Dried Milks.

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AN APPEAL FOR RUSSIAN STUDENTS AND TEACHERS

BY THE UNIVERSITIES COMMITTEE OF THE IMPERIAL WAR RELIEF FUND.

AN appeal for help on behalf of students and teachers in Russia has been addressed to graduate and undergraduate members of the universities of Great Britain and Ireland by a number of distinguished scientists, scholars, and men of letters. Amongst the signatories are: Prof. A. S. Eddington and Sir Richard Gregory, both professors of astronomy; Lord Haldane; Dr. Robert Bridges, the Poet Laureate; Sir Frederick G. Kenyon, President of the Classical Association and Principal Librarian of the British Museum; Sir Bernard Pares, Professor of Russian, University of London; Rev. Dr. Walter Lock, Lady Margaret Professor of Divinity at Oxford; Sir Donald Macalister; Prof. Ch. J. Martin; Sir Henry A. Miers; Sir Ernest Rutherford; Sir Michael Sadler; Sir Arthur Schuster; Prof. Gilbert Murray; Sir Napier Shaw; Sir Arthur Shipley; Very Rev. Sir George Adam Smith; Prof. E. H. Starling; and Sir J. J. Thomson.

The Plight of Russian University Teachers.

The appeal is a sequel to that of Dr. Nansen, the response to which, though good, was not sufficient to meet the appalling need which still exists in the provincial universities of Russia although conditions in Moscow and Petrograd have improved. The Russian Government has done something for these universities, which, it will be remembered, depend upon the State. It has paid, not regularly, but at least now and then, salaries which, in the case of a professor of ten years' standing, amount to above 50s. a month. It has also provided a certain number of food packets. Thanks to these measures there are still some university teachers who can share with their wives and children breakfasts of millet gruel and sunflower oil or dinners of salt fish soup. They are the fortunate ones, and even they have their meal seasoned by bitter anxiety about the future of their families. Salaries may or may not be paid during the winter; when they do come in, a month's salary is often barely enough to provide necessaries for a week. Government food packets will almost certainly cease. Extra teaching or paid work of any kind is now almost impossible to get, as nobody has any money to pay for it. Not only superfluous possessions and comforts, but necessary furniture and all the clothes which are not essential for decency have already been parted with by these unfortunate families; even if there is anybody left to buy, there is nothing left to sell. The garments that remain are not sufficient to protect ill-fed bodies against the winter cold; unless a good deal of outside help is forthcoming, it seems certain that many Russian university men will die themselves or see their children perish by starvation or from the diseases which attend on hunger and cold.

Devotion to Duty.

But, even in these appalling conditions, the problem of supporting their families and of living themselves is not the sole, or indeed the first thought of Russian teachers and students; life is no good to them unless they can carry on their work. In doing so they are faced with difficulties which it is hard for us even to imagine. It is not only that they are without any adequate supply of books, or laboratory equipment, or other implements of study and teaching, but they are cut off from two things which are as the breath of life to scholars, intercourse with the main streams of thought and research and quiet in which to think for themselves. They are almost as out of reach of new books, reports of work done and discoveries made, and all kinds of intellectual intercourse, as if they were in a desert island; but in their wilderness there is no peace. The housing conditions in the Russian university towns are as bad as those in our own slums. One well-known professor of the University of Saratov, we are told, lived and worked for some months *under the stairs* of a house packed with human beings. There he slept, prepared his lectures, and even did some research work. Others have written, studied, and striven for original thought in rooms which were the kitchen, nursery, and bedchamber of large families of adults and children. It is difficult for those who dine in the halls of Christ Church or Trinity, or read in Duke Humphrey's Library, or think in the shadow of King's or looking into the cloisters of Magdalen fully to understand what such conditions as those described mean not only for the body but for the mind. Life in all our universities—though in this connexion it is inevitable to quote Oxford and Cambridge—is full of amenities for the teacher and the student. But the spirit in which Russian scholars and scientists carry on their work will be recognised

and understood in every British university, because it is the hall mark of the true university everywhere.

All those who love learning for her own sake and who passionately desire to add to the knowledge of mankind will be moved to sympathy by the following story of the mathematical faculty of the University of the Crimea. Some important original work had been carried out, and it was felt that it ought to be published to the world. Paper was, however, hard to buy, and even when, after a long delay, the Government consented to provide enough paper for 50 copies, the difficulties were not at an end. Not only was the cost of printing so high that the united resources of all the members of the faculty would not cover it, but some of the necessary mathematical type was unobtainable. The mathematicians, however, were not discouraged; after long search and inquiry they succeeded in getting hold of an old printing press which they set up in the basement of the university building. Then gradually they collected type, and finally, possessed themselves of an old lithograph stone. Teachers and students together got the machine into working order, and set the letter type; still it was incomplete. It was then that one of their number set to work and with exquisite skill and more patience than is usually granted even to mathematicians, transcribed all the rest of the work and all its complicated formulæ upon the lithograph stone. So by manifold labour this piece of original work was produced in a form in which it could be useful to others. Intellectual workers everywhere will sympathise with such an effort as this.

Need for Social Reconstruction.

But if Russian science and learning ought to be supported for their own sake they are hardly less important for the social reconstruction of that unhappy country—a reconstruction so important to mankind. Russian students have always been conspicuous for their devotion to social causes, and have boldly encountered the suspicion and danger which have pursued philanthropic labours in their country under very different forms of government. Many perished under the Czars, and under the Bolsheviks the intellectuals have not, as far as one can gather, had a better fate. But if a new Russia is ever to emerge from the chaos it can only be with the help of a new generation trained in knowledge and disciplined in devotion. For this reason it is as important to help the students now seeking education in Russia as the seasoned scholars who are trying to educate them. Both are assisted by the Universities Committee (General Buildings, Aldwych, W.C. 2). Contributions can be earmarked for students or professors, or left to the discretion of the honorary treasurer. Those who desire further particulars can obtain them from the organising secretary, Miss Iredale, at the above address. It is hardly necessary to add that the Committee is working in close coöperation with Dr. Nansen and under his express sanction. It has, indeed, sent out an appeal by his special request.

ARITHMETICAL PRODIGIES:

THE FACULTIES OF ANALYSIS AND CALCULATION.

THE complete inability of some otherwise accomplished people to grapple with the simplest sum in arithmetic would seem to point to the fact that the faculty of dealing with numbers is something apart within the mechanism of the brain. Mr. Maurice Baring, for instance, tells us in his "Peepshow of Memory" that he failed five times to pass the arithmetic paper in examinations for the diplomatic service, but we know him to be a brilliant writer, a keen critic, and close observer, and must therefore suppose that the arithmetical faculty in his brain is rudimentary or undeveloped. Conversely, this same faculty would seem to be the only one fully developed in some otherwise primitive brains.

In an interesting pamphlet on "Calculating Prodigies,"[1] Mr. V. Numair, whose name suggests a pseudonym derived from numbers, gives a careful account of the various "calculating boys" who have startled and puzzled the world of science of late years. Chief among these prodigies was M. Inaudi, the Italian peasant boy, who began life as a shepherd and then took to begging in the streets with a dancing marmot. He did not learn to read till the age of 20, and, as Charcot pointed out in a report, his memory for colours, forms, events, places, musical airs, and so forth, was not in excess of the normal average, or even below it. He could not visualise a chess-board with the pieces in position, and was surprised that the famous players could do so. Yet he dealt with numbers with an ease and rapidity which startled even the scientific. No calculation came amiss to him. In Paris in 1892 he dealt with "A whole crowd of experiments, too large to record in detail, suggested by the extent, the precision, and the suppleness of his special memory for figures," and thus afforded abundant proof that he was second to none of the calculating prodigies who had preceded him. A single example will suffice.

[1] Printed and published by George Ozon, 81, Dean-street, London, W. 1.

"In an interesting report by the French mathematician Gauchy, we are told of the following test to which the calculator, Henry Mondeux, had been submitted. The Committee required him to learn a number of 24 figures, split up into four equal parts, in such a way as to be able to repeat . . . any, indifferently, of the four divisions of six figures each." Mondeux took five minutes to do this; Inaudi in 59 seconds, "repeated first the second and third portions, next the first portion backwards, and finally the whole of the 24 figures, beginning with the last." At a public performance of the usual kind he was given four terrific tests, involving huge additions, subtractions, multiplications, and divisions, the finding of the cube root of 10,648, the eighth power of 19, and so forth. This whole operation took him five minutes. He then repeated the whole of the numbers, together with the results, of seven principal calculations, taking 1 minute and 20 seconds to do so. Physical anthropologists such as Amat and Broca found him to be a healthy normal child in 1879–80, without symptoms of rickets, but with an abnormally large skull and some signs of asymmetry. Like most brilliant pianists, who play faultlessly from memory, and like many actors, he heard, but did not visualise. Numbers were spoken in his consciousness in his own voice. Along with the analytic mathematician he guessed and groped after square roots, and some of his methods were the traditional ones of Hindus, employed by them in mental arithmetic. His power, in common with that of other calculating prodigies, has been described vaguely as "a gift of nature," as due to abnormal brain development, to "monstrosity," hereditary degeneracy, atavism, and reincarnation.

All these are mystical or valueless suggestions, and Mr. Numair is thereupon led to suggest that calculating boys owe their powers mainly to early environment. Like King David, a musician, they were, he avers, nearly all of them shepherd boys. They, therefore, presumably were much concerned with the rapid counting of sheep, and were otherwise without books, though Pepys, by the by, once met a shepherd on Epsom Common who doted on the scriptures—a man of one book. Grandemange, a shepherd boy, had neither arms nor legs, and in later life did not reckon with his wife, who threw him into the Loire and drowned him, and, some years ago, poor Inaudi got himself exhibited working out calculations, at a café chantant, in a cage full of lions. In less sensational circumstances he would have been utterly forgotten. From all of this we infer that the calculating prodigy is a creature of brilliant mind not broadened by other forms of culture, a primitive with a freak intellect. The fact that George Bidder, the English calculating boy, rose to be President of the Institute of Civil Engineers does not invalidate this assertion.

High mathematicians are often poor arithmeticians, and set the lower intellects in their family circle to do their mere sums for them. Analysis, not calculation, is the test of the true mathematician.

AN EARLY BRAZILIAN LABRET.

To the Editor of THE LANCET.

SIR,—The following excerpt may prove of interest in connexion with Sir John Bland-Sutton's address on Spolia Nemoralia, published in your last issue. It is from the "brief relation of two sundrie voyages made by the Worshipful M. William Haukins, of Plimmouth, father of Sir John Haukins, Knight, late Treasurer of her Majesties Navie, in the yeere 1530 and 1532" as reported by Hakluyt.

"In his second voyage, one of the savage kings of the countrey of Brasil was contented to take ship with him and to be transported hither into England. This Brasilian king being arrived, was brought up to London and presented to K. Henry the 8, lying as then at Whitehall: at the sight of whom the King and all the nobilitie did not a little marvaile, and not without cause: for in his cheeks were holes made according to their savage manner, and therein small bones were planted, standing an inch out from the said holes, which in his owne countrey was reputed for a great braverie. He had also another hole in his nether lip, wherein was set a precious stone about the bignes of a pease."

I am, Sir, yours faithfully,

Kensington, W., Nov. 12th, 1922. S. C. DYKE.

ANOMALIES OF LUNACY ADMINISTRATION.

To the Editor of THE LANCET.

SIR,—May I bring to your notice a rather remarkable state of things connected with a matter which was touched upon in your last issue?—namely, some anomalies exhibited in the working of the Lunacy Act of 1890.

As the law now stands, it is open to anyone to point to a passer-by in the street, and, calling the attention of a Relieving Officer to some remark stated to have been made by the said individual, to set machinery in action which shall result in consigning the victim (without chance of appeal) to the lunacy ward of a Poor-law infirmary, and eventually (through the medium of a very imperfect sub-

stitute for a judicial trial) to indefinite detention in a lunatic asylum. This may happen to persons who are perfectly sane, and who from first to last receive no inkling of the nature of the allegations made against them. Judges have been known to call attention to this perilous condition of affairs and the lack of reasonable protection for the public. Any person who finds himself in such a predicament has as much right as a criminal to be informed of the charges brought against him when such a fate hangs over him. It is a truism that a man (as counsel puts it) should be "tried for his sanity as for his life," and be given a fair chance of refuting or explaining the allegations made. To affirm at the outset that he is *incapable* of so doing is to adjudge him to be a lunatic before he has been heard and to leave the way open to countless abuses.

There is a provision of the Act (S. 28) that an alleged lunatic *must not be committed on hearsay evidence alone.* In the case mentioned in the LANCET of Nov. 11th, the first doctor who was called in diagnosed concussion of the brain due to a fall on the head. The patient's own doctor, who was summoned later, sent her as a lunatic to the infirmary ward on the sole word (as he himself admitted) of a third party. This doctor subsequently stated in evidence that during the eight or nine years when he had previously attended her he had never noticed the slightest symptom which could suggest insanity. Her son, being wired for, found her the same night absolutely normal as to her mind, but discovered a painful swelling at the back of her head, where she had fallen. He wished to exercise the right to which (by S. 22 of the Act) he was entitled, of taking her home on his own responsibility, with concurrence of a magistrate, but was met by the answers so often given to anxious relatives—in direct contravention of the Statute—that he "had *no voice* in the matter." It was left to the jury in the hearing of this case to decide whether an imputation of insanity is defamatory. Their decision, after one and a half hours' deliberation, was in the affirmative.

It has been held by a majority of judges in the Court of Appeal (though not yet confirmed by the House of Lords) that the giving of a medical certificate, upon which the Reception Order for a lunatic is *founded*, and which is undoubtedly a sine qua non in the process of committal, does not involve the doctor in any liability, even in the absence of reasonable attention or examination into the circumstances of the case. It is desirable that when the Lunacy Act comes to be overhauled, some alteration should be made in it, with a view to checking this too facile way of disposing of the liberty of the subject.

I am, Sir, yours faithfully,

S. E. WHITE, M.D., B.Sc.

Upper Montagu-street, W., Nov. 13th, 1922.

PUBLIC HEALTH IN BRITISH GUIANA.

IN 1920 the birth-rate was 31·9 per 1000, as compared with 27·5 per 1000 for the previous five years. The death-rate was 25·6 per 1000 of the estimated population, as against a mean rate for the previous five years of 33·2 per 1000. The following table shows the variations of the birth- and death-rates amongst the different races comprised in the population.

	Birth-rate.	Death-rate.
Portuguese	25·3	30·4
Europeans other than Portuguese	10·6	14·0
East Indians	33·0	26·3
Chinese	27·8	16·6
Blacks	31·1	26·3
Mixed races	32·5	18·9

Of the births registered, 3981, or 40·7 per cent., were legitimate and 5807, or 59·3 per cent., illegitimate. The infantile mortality-rate was 148 per 1000 births. Enteric fever is now a notifiable disease. During 1920 795 cases were notified, with 138 deaths. Anti-malaria and anti-mosquito measures are being generally and gradually enforced. Ankylostomiasis, which has engaged the attention of the medical department for several years, has considerably decreased on sugar estates; this is attributed to improved sanitary measures and the erection of latrines. The whole of the inhabited portion of the Colony is gradually being brought under the control of the authorities by the appointment of district sanitary inspectors, who work under the close supervision of the Government municipal departments. There are five public hospitals in the principal centres of population, and the outlying districts are served by dispensary hospitals and dispensaries. The immigration law also requires the maintenance of hospitals on every plantation, and these institutions are available for the treatment of emergency and pauper cases from the general community. At the leper asylum there were 273 patients (198 males and 75 females) when the year began, and during the year 87 were admitted.

Report for 1921.—The estimated population on Dec. 31st, 1921, was 298,188—151,439 males and 146,749 females. The birth-rate for 1921 was 34·5 and the death-rate 30·9 per 1000. Of the births 60·5 per cent. were illegitimate. The death-rate varied considerably amongst the races comprising the population. There were no epidemics during 1921, and the general health of the colony was good. In June a medical conference, the first of its kind to be held in the West Indies, was convened at Georgetown; delegates from most of the West Indian Islands and from the London School of Tropical Medicine attended.

SELF-DEFENCE OR CRUELTY.

A MEDICAL man has recently defended himself successfully against a charge of an unusual character involving the accusation of cruelty to a dog by the use of an ammonia squirt when attacked while riding a bicycle. The defendant stated in the witness-box that he had used a solution of 1 part of ammonia in 20 and submitted that he had adopted the most humane manner possible for effectively driving off the assailant. Two veterinary surgeons bore out this view and stated that no permanent injury had been inflicted. The magistrate held that the rider of a bicycle in such circumstances had the right to defend himself and, if necessary, to inflict pain in doing so, and dismissed the summons. This besides being a correct decision legally, should commend itself to everyone as consistent with good sense. Dogs are sometimes sources of serious danger to the public, and particularly to persons on bicycles. The medical man is to be congratulated upon his successful defence from the penalties sought, and it is to be hoped that the dog itself will have profited from a lesson which would have been unnecessary if it had been better trained. It need hardly be said that a solution used for such a purpose must inflict temporary pain only.

THE LITERATURE OF CONJUGAL TUBERCULOSIS.

THE subject of the transmission of tubercle from husband to wife and vice versa has been much discussed, but the information is widely scattered over publications in various countries. We are glad to reproduce a list of references compiled in the National Health Library (370, Seventh Avenue, New York City), and put at our disposal by Dr. F. Ward, tuberculosis officer for Devon county.

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